



TETRA TECH

July 30, 2014

Mr. Todd Campbell  
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**Subject:** Final Pre-CERCLIS Screening Report  
Bridgeton Municipal Athletic Complex, Bridgeton, Missouri  
U.S. EPA Region 7 START 4, Contract No. EP-S7-13-06, Task Order No. 0002.023  
**Task Monitor:** Todd Campbell, On-Scene Coordinator

Dear Mr. Campbell:

Tetra Tech, Inc. is submitting the attached Final Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Screening Report regarding the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. If you have any questions or comments, please call me at (816) 412-1785.

Sincerely,

A handwritten signature in black ink, appearing to read "Colin Willits".

Colin Willits  
START Project Manager

A handwritten signature in black ink, appearing to read "Ted Faile".

Ted Faile, PG, CHMM  
START Program Manager

Enclosures

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**FINAL PRE-CERCLIS SCREENING REPORT  
BRIDGETON MUNICIPAL ATHLETIC COMPLEX  
BRIDGETON, MISSOURI**

**Superfund Technical Assessment and Response Team (START) 4 Contract  
Contract No. EP-S7-13-06, Task Order 0002.023**

Prepared For:

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Region 7  
Superfund Division  
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July 30, 2014

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## **1.0 INTRODUCTION**

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to assist with a Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (Pre-CERCLIS) Screening at the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. The Pre-CERCLIS Screening was conducted to evaluate whether further Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) assessment would be warranted. The screening was in response to a request by the Missouri Attorney General to the EPA Regional Administrator after a community group reported detections of elevated radiation readings at BMAC.

Tetra Tech's tasks included, but were not limited to: (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collection of discrete soil samples from BMAC for laboratory analysis collocated with samples collected by the community group, (5) completion of a Pre-CERCLIS Screening Form, and (6) documentation of site activities. This final Pre-CERCLIS screening report addresses soil sampling and analytical data, along with a review of all site activities. The gross-gamma survey was detailed in the Preliminary Pre-CERCLIS Screening report dated June 25, 2014.

Colin Willits was the START project manager for the investigation, and the EPA Region 7 On-Scene Coordinator (OSC) was Todd Campbell.

## **2.0 SITE LOCATION AND BACKGROUND**

Section 2.0 provides information on the site location and description, and site background.

### **2.1 SITE LOCATION AND DESCRIPTION**

The BMAC site is at 13161 Taussig Road in Bridgeton, Missouri. The Global Positioning System (GPS) coordinates of the approximate center of the site are 38.779422 degrees north latitude and 90.428224 degrees west longitude. The site encompasses approximately 70 acres, including 11 baseball fields, four tennis courts, a playground area, a handball/racquetball court, a soccer field, multiple walking trails, two large parking lots, multiple concession buildings, an operation center, and other various structures (see Appendix A, Figures 1 and 2).

Two parks, Koch and Blanchette, were selected to acquire reference data during the Pre-CERCLIS Screening. These parks were selected as reference areas because they contain surface types similar to those at BMAC (including baseball fields with grass-covered and exposed soil areas). Koch Park is 4.1 miles northeast of BMAC near the intersection of Charbonier and Howdershell Roads in Florissant, Missouri. The park encompasses 70 acres and includes several baseball fields. Blanchette Park is 3.3 miles west-northwest of BMAC at 1900 West Randolph Road in St. Charles, Missouri. The park encompasses 44 acres, including several baseball fields (see Appendix A, Figure 1). The two reference areas provide contrasting positions from BMAC relative to prevailing wind directions—that is, Koch Park is generally cross- to downwind of BMAC, and Blanchette Park is generally upwind of BMAC, given the predominant prevailing winds in the area out of the south and west.

## **2.2 PRESENT OWNERS**

BMAC is owned and operated by the City of Bridgeton, Missouri.

## **2.3 SITE HISTORY**

BMAC opened in 1974, encompassing 30 acres including six baseball fields, four tennis courts, four racquetball courts, a concessions building, a pavilion, and an operations storage facility. During the mid-1980s, four batting cages were installed on the south side of the complex. The batting cages were removed in 2007. In 1999, the City of Bridgeton began a phased expansion of BMAC. The 10-year expansion project added five baseball fields (2001 to 2003), a new park maintenance facility (2002), expanded north parking lot (2003 to 2004), one additional concession building (2004 to 2005), one soccer field (2005), one comfort station (2007), a 2-mile walking trail (2008), a playground (2008), and an office and entry building (2009). During construction of the baseball and soccer fields, more than 990,000 cubic feet ( $\text{ft}^3$ ) of soil was brought onto the complex. Soil was acquired from and transported by Noll Construction. The baseball infields were built with a 60/40 mix of sand/silt and clay to conform with University of Missouri recommendations. The outfields were topped with an 80/20 mix of sand and peat, received from the St. Charles Sand Company. In 2012, two infields (Fields 8 and 11) were amended with mined “Granitestone” aggregate from Ironton, Missouri.

Stormwater exits the complex via a combination of storm drains, one detention pond, and surrounding retention swales (Bell 2014).

## **2.4 CURRENT LAND USE**

BMAC currently encompasses approximately 70 acres, including 11 baseball fields, four tennis courts, a playground area, a handball/racquetball court, a soccer field, multiple walking trails, two large parking lots, multiple concession buildings, an operation center, and other various structures.

## **2.5 STRUCTURES AT SITE**

Structures at BMAC include concession stands, restrooms, a park operation center, and an operations storage facility. The nearest residence is 0.36 mile southwest of the park (Google Earth 2014).

## **2.6 PAST ACTIONS**

No previous investigations have occurred at the BMAC site.

## **2.7 GEOLOGY**

The U.S. Geological Survey (USGS) 7.5-minute topographic map depicting the site and general vicinity was obtained and reviewed. The general location of the site is shown on the 1994 USGS St. Charles, Missouri quadrangle map (USGS 1994). The St. Charles quadrangle includes part of the Missouri River floodplain and loess-covered uplands. The floodplain is up to 5 miles wide in this area. The quadrangle lies within the Dissected Till Plains Section of the Central Lowland Province of the Interior Plains Physiographic Division. The St. Charles quadrangle is underlain by Paleozoic limestone and shale. The majority of the quadrangle is underlain by the Mississippian-age St. Louis, Salem, and Warsaw Formations. The site is near a boundary of Quaternary silt-capped alluvium and Quaternary terrace deposit. The Quaternary Silt-Capped Alluvium is primarily composed of clay and variable amounts of silt and organic material in the upper 15 feet. The Quaternary Terrace Deposit consists mainly of organic clays (MDNR 2011).

## **3.0 PRE-CERCLIS SCREENING ACTIVITES**

Field activities for the Pre-CERCLIS Screening were conducted May 19 to 23, 2014. Field activities included (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collection of discrete soil samples for laboratory analysis collocated with samples previously collected by the community group, and (5) documentation of site activities. START team members

included Colin Willits, Danny O'Connor, and Tom Binz. EPA personnel included Region 7 OSCs Todd Campbell and Tom Mahler and Region 5 personnel Brian Cooper and Jim Mitchell. Photographic documentation of field activities is in Appendix B. START documented field activities in the site logbook (see Appendix C).

### **3.1 SURFACE SOIL GAMMA SURVEY**

From May 20 to 22, 2014, EPA and START field personnel conducted a survey of gross gamma activity over exterior areas of BMAC. In addition, two reference areas were surveyed from May 19 to 21, 2014, to provide comparative data (Koch Park and Blanchette Park). The survey data were generated using a Ludlum Model 2221 ratemeter with a Ludlum Model 44-20 sodium iodide (NaI) scintillation detector, coupled with a GPS unit and notebook computer running Field Analysis and Sampling Tool (FAST) software. FAST is a software program developed by the EPA Region 5 Field Environmental Decision Support (FIELDS) Team that integrates real-time data from GPS receivers and environmental monitoring instruments. FAST stores the measurement data with their GPS locations in a file and plots the results in a dynamic, two-dimensional display in real time. To ensure proper functioning of radiation detection instrumentation, a twice-daily (prior to and after field work) source check was performed by use of a cesium-137 check source. No abnormal variations in detector readings, indicating an instrument "drifting" out of calibration, were documented. Daily source check and instrument calibration records are in Appendix D.

The gross gamma survey of exterior surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the background mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. The gross gamma survey is detailed further in the Preliminary Pre-CERCLIS Screening Report dated June 25, 2014 (Tetra Tech 2014).

### **3.2 SOIL SAMPLING ACTIVITIES**

After the survey of gross gamma activity over exterior areas of BMAC and reference areas, surface soil samples were collected to quantify both gamma emitting and non-gamma emitting radionuclides. Soil sampling locations were chosen to best represent soil type variability and geographic coverage of the site because review of survey data indicated no unusual patterns of concentrated discrete areas of elevated gross gamma activity. Geographic information system (GIS) personnel used GIS software to designate

10 foot by 10 foot Decision Units (DU) across the site. The GIS software was uploaded to a hand-held digital device for field use. Field crews utilized the digital device along with flags and stakes to delineate DUs. From May 21 to 23, 2014, EPA and START personnel collected 112 soil samples. Eighty-eight surface soil samples (0 to 2 inches below ground surface [bgs]) were collected at BMAC. The samples included the following: 30 composite samples collected within grass-covered areas, 30 composite samples collected within exposed soil areas, 17 discrete samples collected within drainage areas, and 11 discrete samples collocated with samples previously collected by the community group (see Appendix A, Figure 3). Twenty-four samples were collected within the two reference areas: Koch Park and Blanchette Park (see Appendix A, Figure 4).

Composite soil samples consisted of five-aliquots of approximate equal mass collected from points distributed evenly over the DU. Samples were collected from 0 to 2 inches bgs using a disposable steel spoon or decontaminated hand-held trowel. Discrete soil samples were single aliquot samples collected from 0 to 2 inches bgs with a disposable steel spoon or decontaminated hand-held trowel. Samples were transferred to labeled sealable plastic bags and placed in coolers for transportation to the laboratory.

Soil samples were submitted for analysis to TestAmerica Laboratories, Inc. (TestAmerica), in Earth City, Missouri. Soil samples were analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides (see Table 1).

**TABLE 1**  
**SUMMARY OF ANALYTICAL METHODS**

Laboratory Analysis	Analytical Method
Isotopic Thorium (including Th-230)	DOE EML Procedures Manual HASL-300 A-01-R
Isotopic Uranium (including U-238)	DOE EML Procedures Manual HASL-300 A-01-R
Gamma Spectrometry (including Ra-226)	21 day in-growth for Ra-226 daughters followed by DOE EML Procedures Manual HASL-300 Ga-01-R

Notes:

DOE EML      U.S. Department of Energy Environmental Measurements Laboratory  
Ra-226      Radium-226  
Th-230      Thorium-230  
U-238      Uranium-238

#### **4.0 ANALYTICAL DATA SUMMARY**

During Pre-CERCLIS Screening activities, 112 soil samples were collected from BMAC and reference areas. Soil samples were submitted for analysis to TestAmerica on May 22 and 23, 2014 (see Table 1). The analytical data package and corresponding chain-of-custody documents are in Appendix E. After the analytical data package had been received, a Tetra Tech chemist completed a data validation report in accord with the EPA Region 7 documents titled "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" (EPA 2010) and Chapter 8 of "Multi-Agency Radiological Laboratory Analytical Procedures Manual" (MARLAP), 402-B-04-001A (EPA 2004). In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (Tetra Tech EM, Inc. [Tetra Tech EMI] 2002) was used along with other criteria specified in the applicable methods. The data validation report concluded overall data quality is acceptable, with no unusual qualifications added. All data are usable as qualified for their intended purposes (see Appendix F).

Uranium-238, thorium-230, and radium-226 have been identified as constituents of potential concern (COPC) for the BMAC site, as they have been identified as contaminants at Formerly Utilized Sites Remedial Action Program (FUSRAP) sites in the St. Louis, Missouri, area. In addition, the community group expressed concern with lead-210 at BMAC (lead-210 is a daughter product of radium-226).

Twenty-four soil samples were collected at two reference areas (Koch and Blanchette Park) to quantify naturally occurring radioactive material (NORM) concentrations in the site vicinity. NORM were incorporated into the Earth during its formation and are still present. Rocks, soil, water, air, plants, and animal life all have varying degrees of NORM (U.S. Nuclear Regulatory Commission [NRC] 1994). Using ProUCL Version 5.0.00, reference area analytical data for the COPCs were used to calculate upper simultaneous limits (USL) to estimate background threshold values (BT<sub>V</sub>) to be used in site versus background evaluations. ProUCL is an EPA-funded and peer-reviewed software used for various basic statistical analyses, including BT<sub>V</sub>s (EPA 2013). Reference area analytical data reported with the qualifier "U", analyte not detected above the reported sample quantitation limit, were not used in the calculation of BT<sub>V</sub>s. A background data set of less than six is not large enough to characterize background population or to perform background versus site comparison (EPA 2013). Very few detectable values were reported from reference area analytical data for lead-210; therefore, the calculated BT<sub>V</sub> may not represent meaningful or reliable statistics. Radionuclide concentrations in excess of their BT<sub>V</sub> are compared with the selected risk-based standards to determine if further data review or investigation is warranted. BT<sub>V</sub> calculation spreadsheets are included in Appendix G. A summary of reference area analytical data and BT<sub>V</sub>s is listed in Table 2.

**TABLE 2**  
**SUMMARY STATISTICS FOR REFERENCE AREA DATA**

Statistic	U-238*	Th-230*	Ra-226	Pb-210
Lowest Reported Value	0.512	0.636	0.794	2.73
Highest Reported Value	0.896	1.22	1.65	4.12
Mean	0.636	0.92	1.16	3.46
BTM	0.915	1.35	1.69	4.12**

Notes:

All concentrations in picoCuries per gram (pCi/g)

\* Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry.  
\*\* Indicates a value calculated without enough data to compute meaningful or reliable statistics.

BTM Background threshold value

Pb-210 Lead-210

Ra-226 Radium-226

Th-230 Thorium-230

U-238 Uranium-238

Reference area analytical data were also compared with five studies quantifying NORM in the United States. Summary statistics from the NORM studies are listed in Table 3.

**TABLE 3**  
**SUMMARY STATISTICS FOR NORM STUDIES**

Study Area	U-238 (pCi/g)		Th-230 (pCi/g)		Ra-226 (pCi/g)	
	Mean	Range	Mean	Range	Mean	Range
United States <sup>1</sup>	0.90	0.10 - 3.8	-	-	1.1	0.20 - 4.3
United States <sup>2</sup>	-	0.10 - 3.8	-	-	-	-
United States <sup>3</sup>	1.8	-	-	-	-	-
Missouri <sup>4</sup>	-	0.33 - 1.7	-	-	-	0.31 - 1.4
St. Louis <sup>5</sup>	1.1	-	1.5	-	0.95	-

Notes:

<sup>1</sup> Study completed by United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (UNSCEAR 2000)

<sup>2</sup> Study completed by Myrick and others (Myrick *et al.* 1983)

<sup>3</sup> Study completed by Lowder and others (Lowder *et al.* 1964)

<sup>4</sup> Study completed by Oak Ridge National Laboratory (ORNL) (ORNL 1981)

<sup>5</sup> Study completed by U.S. Army Corps of Engineers (USACE) (USACE 2005)

NORM Naturally Occurring Radioactive Material  
pCi/g picoCuries per gram  
Ra-226 Radium-226

Th-230 Thorium-230  
U-238 Uranium-238

The reported radionuclide concentrations for the uranium-238 series from the Koch and Blanchette Park reference areas were consistent with these studies, indicating the reference area analytical data are representative of NORM for the general site vicinity.

Two risk-based standards were used for comparison to BMAC analytical data: the EPA total exposure preliminary remediation goals (PRG) for radionuclides in residential soil at a 1 in 10,000 upper bound lifetime cancer risk to an individual, and the FUSRAP remediation goals (RG). Selection of the 1 in 10,000 upper bound lifetime cancer risk to an individual accords with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), listed in 40 *Code of Federal Regulations* (CFR) Part 300.430 (EPA 1990). The total soil PRGs account for risk from each of the four pathways considered in the PRGs: ingestion, inhalation, external exposure, and produce ingestion pathways. PRGs are generated with standard exposure route equations using EPA slope factors (SF) and exposure parameters. The calculation of the residential soil PRGs take into account the following exposure parameters: (1) 30 years of total exposure, (2) 350 days per year of exposure, and (3) 24 hours per day of exposure (EPA 2014). These assumptions do not likely represent true exposure risk for park visitors but were chosen due to their conservative nature. In instances where isotopes within a decay series were determined to be in secular equilibrium, the “+D” PRG (such as for Ra-226+D) was selected for comparison to the site data. Although it may not be possible to discern from analytical data when isotopes within a decay chain are in true secular equilibrium, for the purposes of this assessment the “+D” PRG risk-based standards were used when available for comparative purposes due to their conservative nature. The “+D” PRGs include the contributions from the parent isotope and its short-lived decay products, assuming equal activity concentrations (secular equilibrium) with the parent nuclide in the environment (EPA 2014). The FUSRAP RGs for the North St. Louis County sites were developed consistent with protective applicable or relevant and appropriate requirements (ARAR) (U.S. Army Corps of Engineers [USACE] 2005). Table 4 summarizes analytical data from BMAC along with comparing the highest value from each isotope, minus the mean reference area value, to risk-based standards. Analytical data are presented in tabular form in Appendix H.

**TABLE 4**  
**BMAC ANALYTICAL DATA COMPARISON**

	U-238*	Th-230*	Ra-226	Pb-210
<b>BMAC Analytical Data Summary (pCi/g)</b>				
Low	0.0862	0.441	0.458	1.68
High	1.74	1.77	1.71	9.45
Number of values exceeding the BTV	5 of 88	5 of 88	1 of 88	9 of 88
<b>Reference Area Mean Values (pCi/g)</b>				
Mean Values	0.636	0.92	1.16	3.46
<b>Comparative Values (pCi/g)</b>				
Highest Comparative BMAC value**	1.10	0.850	0.550	5.99
<b>Risk-based Standards (pCi/g)</b>				
Residential Soil PRG ( $10^{-4}$ )	69.6 <sup>(+D)</sup>	346	1.21 <sup>(+D)</sup>	33.5
FUSRAP RG	50	14	5	NE

Notes:

PRGs and FUSRAP RGs represent risk-based standards meant for comparison to sample concentrations above background; therefore, the mean reference area radionuclide concentration was subtracted from BMAC data before comparison.

\* Indicates isotope analyzed via alpha spectrometry. Unmarked isotopes were analyzed via gamma spectrometry  
 \*\* Value represents the reference area mean subtracted from the highest reported concentration from BMAC samples  
 (+D) Indicates the listed value is the PRG+D value that accounts for risk from short-lived daughter products

BMAC	Bridgeton Municipal Athletic Complex
BTV	Background Threshold Value
FUSRAP	Formerly Utilized Sites Remedial Action Program
NE	No FUSRAP RG is established for lead-210.
Pb-210	Lead-210
pCi/g	picoCuries per gram
PRG	Preliminary Remediation Goal
Ra-226	Radium-226
RG	Remediation Goal
Th-230	Thorium-230
U-238	Uranium-238

A summary of data for COPCs and lead-210 follows:

Detectable uranium-238 concentrations from alpha spectrometry analysis in BMAC samples range from 0.0862 to 1.74 pCi/g. Using reference area analytical data, a BTV of 0.915 pCi/g was calculated for uranium-238 (alpha spectrometry). The uranium-238 concentration (alpha spectrometry) in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the uranium-238 reference area mean (alpha spectrometry) was subtracted from results for the samples exceeding the BTV to eliminate NORM. The remaining values were then compared with the PRG +D (69.6 pCi/g) and the FUSRAP RG (50 pCi/g). None of the values exceeded the PRG or FUSRAP RG. Uranium-238 was also reported with gamma spectrometry analysis;

although this data is considered less accurate as it does not represent a direct measurement of the isotope. No uranium-238 concentrations reported from gamma spectrometry analysis exceeded the PRG or FUSRAP RG.

Detectable thorium-230 concentrations in BMAC samples range from 0.441 to 1.77 pCi/g. Using reference area analytical data, a BTV of 1.35 pCi/g was calculated for thorium-230. The thorium-230 concentration in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the thorium-230 reference area mean was subtracted from the results for the five samples to eliminate NORM. The remaining values were then compared with the PRG (346 pCi/g) and the FUSRAP RG (14 pCi/g). None of the values exceeded the PRG or FUSRAP RG.

Detectable radium-226 concentrations in BMAC samples range from 0.458 to 1.71 pCi/g. Using reference area analytical data, a BTV of 1.69 pCi/g was calculated for radium-226. The radium-226 concentration in one sample collected from BMAC exceeded the BTV. The sample was therefore compared with the applicable risk-based standards. To begin, the radium-226 reference area mean was subtracted from the result for the sample to eliminate NORM. The remaining value was then compared with the PRG +D (1.21 pCi/g) and the FUSRAP RG (5 pCi/g). Although it may not be possible to discern if the uranium-238 decay chain (including daughter product radium-226) is in true secular equilibrium, for the purposes of this assessment the PRG +D risk-based standard was determined to be the more applicable comparative standard due to its conservative nature. The sample value did not exceed the PRG +D or FUSRAP RG.

Detectable lead-210 concentrations in BMAC samples range from 1.68 to 9.45 pCi/g. Reference area analytical data reported few detectable concentrations of lead-210; therefore, insufficient data was available to calculate a meaningful BTV. For this reason, lead-210 was compared directly to the PRG. No reported lead-210 data from BMAC samples exceeded the PRG (No FUSRAP RG is established for lead-210).

The BMAC Pre-CERCLIS Screening focused on COPCs identified as contaminants at nearby FUSRAP sites; however, many other radionuclides were reported with laboratory analysis. No significant concentrations were identified during the review of other reported radionuclide.

## **5.0 PATHWAY EVALUATION**

### **5.1 GROUNDWATER MIGRATION PATHWAY**

According to the USGS Groundwater Atlas of the United States, the site and nearby areas of St. Louis County are within the Mississippian aquifer. The Mississippian aquifer is in carbonate rocks stratigraphically equivalent to those composing the nearby Ozark Plateaus aquifer system (USGS 2014).

Groundwater sampling was not included with the Pre-CERCLIS Screening. However, a release to groundwater is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

### **5.2 SURFACE WATER MIGRATION PATHWAY**

Review of the St. Charles, Missouri, quadrangle topographic map indicates site runoff is northwest, following the general site topographic gradient toward the Missouri River. According to the U.S. Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) System, no wetlands are present on the BMAC site (U.S. FWS 2014a). A surface water retention pond is visible near Prouhet Farm Road and was confirmed during site activities. Cowmire Creek is 0.16 mile east of BMAC. The Missouri River is 2.15 miles northwest of BMAC (Google Earth 2014).

Surface water sampling was not included with the Pre-CERCLIS Screening. However, a release to surface water is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

### **5.3 SOIL EXPOSURE PATHWAY**

Soil assessment during the Pre-CERCLIS Screening included: (1) acquisition of real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assessment of gross gamma survey results to help select sampling locations, (3) collection of discrete and composite soil samples from BMAC and reference areas for laboratory analysis, and (4) collection of discrete soil samples for laboratory analysis collocated with samples collected by the community group.

No gross gamma survey data acquired within BMAC were above twice the reference area mean, a level at which EPA Region 7 typically conducts further investigation. In addition, no unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. BMAC soil sample data

were compared to applicable risk-based standards. No radionuclide concentrations were reported above the risk-based standards plus background.

A release to soil is unlikely because there were no significant findings during the gross gamma survey or analytical data comparison.

#### **5.4 AIR MIGRATION PATHWAY**

Air sampling was not included with the Pre-CERCLIS Screening. A release to air is unlikely because no significant surface soil findings resulted from the Pre-CERCLIS Screening.

#### **5.5 OBVIOUS POTENTIAL HUMAN AND ECOLOGICAL RECEPTORS**

Facility users include on-site workers (park maintenance crew) and park visitors. No release has been identified at the BMAC site; therefore, there does not appear to be a potential threat to receptors. The BMAC Pre-CERCLIS Screening Form is in Appendix I.

## **6.0 SUMMARY AND CONCLUSIONS**

### **6.1 PRE-REMEDIAL CONSIDERATIONS**

The Pre-CERCLIS Screening did not indicate a release of radionuclides to surface soil. No potential exposure risk to humans or endangered or threatened species was identified during assessment activities. Further CERCLA assessment is not warranted at BMAC.

### **6.2 CONCLUSIONS**

Pre-CERLCIS Screening activities at the BMAC site were conducted May 19 to 23, 2014. The objectives of the screening were to: (1) acquire real-time gross gamma measurements of exterior surfaces at BMAC and reference areas, (2) assess gross gamma survey results to help select sampling locations, (3) collect discrete and composite soil samples from BMAC and reference areas for laboratory analysis, (4) collect discrete soil samples from BMAC for laboratory analysis collocated with samples collected by the community group, (5) complete a Pre-CERCLIS Screening Form, and (6) document site activities.

The gross gamma survey of exterior surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the reference area mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed.

After the gross gamma survey had been completed, soil samples were collected to quantify both gamma emitting and non-gamma emitting radionuclides. Soil sampling locations were chosen to best represent soil type variability and site coverage because review of survey data indicated no unusual patterns of concentrated discrete areas of elevated gross gamma activity. Soil samples were analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides. Uranium-238, thorium-230, and radium-226 have been identified as COPCs for the BMAC site, as they have been identified as contaminants at FUSRAP sites in the St. Louis, Missouri area. In addition, the community group expressed concern with lead-210 at BMAC. Analytical data were compared with the total exposure PRGs for radionuclides in residential soil at a 1 in 10,000 upper bound lifetime cancer risk to an individual. Using ProUCL Version 5.0.00, reference area analytical data for the COPCs were used to calculate USLs to estimate BTVs to be used in site versus background evaluations. Radionuclide

concentrations in excess of their BTV were compared with the selected risk-based standards to determine if further data review or investigation was warranted.

A summary of data for COPCs and lead-210 follows:

Detectable uranium-238 concentrations from alpha spectrometry analysis in BMAC samples range from 0.0862 to 1.74 pCi/g. Using reference area analytical data, a BTV of 0.915 pCi/g was calculated for uranium-238 (alpha spectrometry). The uranium-238 concentration (alpha spectrometry) in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the uranium-238 reference area mean (alpha spectrometry) was subtracted from results for the samples exceeding the BTV to eliminate NORM. The remaining values were then compared with the PRG +D (69.6 pCi/g) and the FUSRAP RG (50 pCi/g). None of the values exceeded the PRG or FUSRAP RG. Uranium-238 was also reported with gamma spectrometry analysis; although this data is considered less accurate as it does not represent a direct measurement of the isotope. No uranium-238 concentrations reported from gamma spectrometry analysis exceeded the PRG or FUSRAP RG.

Detectable thorium-230 concentrations in BMAC samples range from 0.441 to 1.77 pCi/g. Using reference area analytical data, a BTV of 1.35 pCi/g was calculated for thorium-230. The thorium-230 concentration in five samples collected from BMAC exceeded the BTV. The five samples are therefore compared with their applicable risk-based standards. To begin, the thorium-230 reference area mean was subtracted from the results for the five samples to eliminate NORM. The remaining values were then compared with the PRG (346 pCi/g) and the FUSRAP RG (14 pCi/g). None of the values exceeded the PRG or FUSRAP RG.

Detectable radium-226 concentrations in BMAC samples range from 0.458 to 1.71 pCi/g. Using reference area analytical data, a BTV of 1.69 pCi/g was calculated for radium-226. The radium-226 concentration in one sample collected from BMAC exceeded the BTV. The sample was therefore compared with the applicable risk-based standards. To begin, the radium-226 reference area mean was subtracted from the result for the sample to eliminate NORM. The remaining value was then compared with the PRG +D (1.21 pCi/g) and the FUSRAP RG (5 pCi/g). Although it may not be possible to discern if the uranium-238 decay chain (including daughter product radium-226) is in true secular equilibrium, for the purposes of this assessment the PRG +D risk-based standard was determined to be the more applicable comparative standard due to its conservative nature. The sample value did not exceed the PRG +D or FUSRAP RG.

Detectable lead-210 concentrations in BMAC samples range from 1.68 to 9.45 pCi/g. Reference area analytical data reported few detectable concentrations of lead-210; therefore, insufficient data was available to calculate a meaningful BTV. For this reason, lead-210 was compared directly to the PRG. No reported lead-210 data from BMAC samples exceeded the PRG (No FUSRAP RG is established for lead-210).

The BMAC Pre-CERCLIS Screening focused on COPCs identified as contaminants at nearby FUSRAP sites; however, many other radionuclides were reported with laboratory analysis. No significant concentrations were identified during the review of other reported radionuclide. Results from the Pre-CERCLIS Screening do not indicate need for further CERCLA assessment at the BMAC site.

## 7.0 REFERENCES

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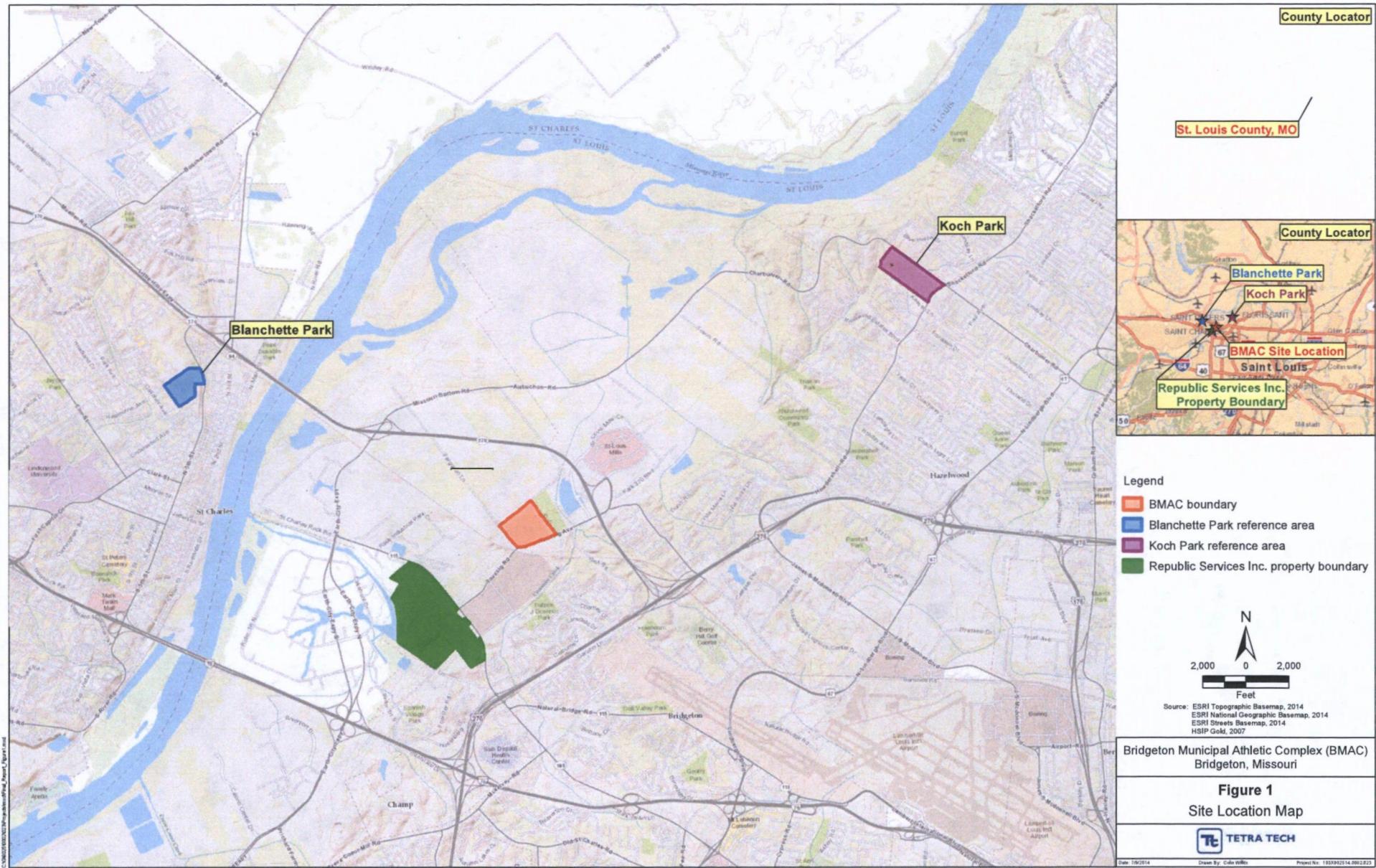
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**APPENDIX A**

**FIGURES**



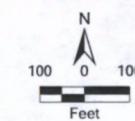




Source: ESRI Imagery Basemap, 2014

Note: Shaded cells depict the 10 meter by 10 meter areas where composite soil samples were collected. From each cell, a five aliquot soil sample was collected, homogenized, and submitted for laboratory analysis. The adjacent graphic depicts the typical aliquot sampling pattern.

Discrete soil samples BMAC-Discrete-00 through BMAC-Discrete-10 were collocated with community group samples BMAC0000 through BMAC0010 consecutively.



Bridgeton Municipal Athletic Complex (BMAC)  
Bridgeton, Missouri

Figure 3  
BMAC Soil Sampling Summary



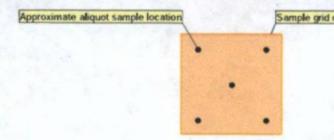
Sample ID	Sample Date	U-238	Tb-236	Ra-226	Pb-210
<i>Sampled 10 meter by 10 meter areas (cont'd)</i>					
BMAC-Discrete-00	5/2/2014	0.734	0.960	1.08	0.847
BMAC-Discrete-01	5/2/2014	0.851	1.25	1.43	0.51
BMAC-Discrete-02	5/2/2014	0.828	1.05	1.25	0.43
BMAC-Discrete-03	5/2/2014	0.828	1.05	1.25	0.43
BMAC-Discrete-04	5/2/2014	0.593	0.899	0.943	0.45
BMAC-Discrete-05	5/2/2014	0.640	0.770	0.972	0.988
BMAC-Discrete-06	5/2/2014	0.784	1.05	1.17	0.51
BMAC-Discrete-07	5/2/2014	0.643	0.720	0.891	0.32
BMAC-Discrete-08	5/2/2014	0.539	0.918	1.14	0.94
BMAC-Discrete-09	5/2/2014	0.539	0.918	1.14	0.94
BMAC-Discrete-10	5/2/2014	0.621	0.797	1.13	0.38
BMAC-Coffield-1	5/2/2014	0.605	1.04	1.22	0.82
BMAC-Coffield-2	5/2/2014	0.605	1.04	1.22	0.82
BMAC-Coffield-3	5/2/2014	0.621	1.04	1.22	0.82
BMAC-Coffield-4	5/2/2014	0.588	0.987	1.14	1.15
BMAC-Coffield-5	5/2/2014	0.589	0.987	1.14	1.15
BMAC-Coffield-6	5/2/2014	0.587	0.979	0.978	0.90
BMAC-Coffield-7	5/2/2014	0.587	0.979	0.978	0.90
BMAC-Coffield-8	5/2/2014	0.604	0.984	0.984	0.90
BMAC-Coffield-9	5/2/2014	0.608	1.03	0.787	0.60
BMAC-Coffield-10	5/2/2014	0.609	1.03	0.787	0.60
BMAC-Coffield-11	5/2/2014	0.520	1.08	1.09	2.24
BMAC-Coffield-12	5/2/2014	0.614	1.48	1.03	0.86
BMAC-Coffield-13	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-14	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-15	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-16	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-17	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-18	5/2/2014	0.604	1.08	0.99	0.74
BMAC-Coffield-19	5/2/2014	0.605	1.08	0.99	0.74
BMAC-Coffield-20	5/2/2014	0.604	0.853	1.12	4.46
<i>BMAC-Composite Samples (cont'd)</i>					
BMAC-Green-1	5/2/2014	0.558	0.999	1.15	1.81
BMAC-Green-2	5/2/2014	0.558	0.999	1.15	1.81
BMAC-Green-3	5/2/2014	0.604	0.957	1.18	2.79
BMAC-Green-4	5/2/2014	0.605	0.957	1.18	2.79
BMAC-Green-5	5/2/2014	0.605	1.08	1.37	4.44
BMAC-Green-6	5/2/2014	0.585	0.986	0.665	0.944
BMAC-Green-7	5/2/2014	0.578	0.987	0.665	0.944
BMAC-Green-8	5/2/2014	0.582	0.987	0.665	0.944
BMAC-Green-9	5/2/2014	0.475	0.766	0.478	0.697
BMAC-Green-10	5/2/2014	0.475	0.766	0.478	0.697
BMAC-Green-11	5/2/2014	0.475	0.766	0.478	0.697
BMAC-Green-12	5/2/2014	0.589	0.999	0.880	1.30
BMAC-Green-13	5/2/2014	0.672	0.837	0.829	2.34
BMAC-Green-14	5/2/2014	0.586	0.999	0.880	1.30
BMAC-Green-15	5/2/2014	0.586	0.999	0.880	1.30
BMAC-Green-16	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-17	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-18	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-19	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-20	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-21	5/2/2014	0.585	0.999	0.880	1.30
BMAC-Green-22	5/2/2014	0.603	1.03	1.04	3.01
BMAC-Green-23	5/2/2014	0.657	0.844	0.963	0.436
BMAC-Green-24	5/2/2014	0.657	0.844	0.963	0.436
BMAC-Green-25	5/2/2014	0.655	1.08	1.09	3.07
BMAC-Green-26	5/2/2014	0.655	1.08	1.09	3.07
BMAC-Green-27	5/2/2014	0.657	0.985	1.09	3.08
BMAC-Green-28	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-29	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-30	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-31	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-32	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-33	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-34	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-35	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-36	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-37	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-38	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-39	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-40	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-41	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-42	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-43	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-44	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-45	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-46	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-47	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-48	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-49	5/2/2014	0.520	0.813	1.19	2.47
BMAC-Green-50	5/2/2014	0.520	0.813	1.19	2.47

Notes	
Indicates isotopic analysis via alpha spectrometry.	
Uncollected isotopes were analyzed via gamma spectrometry.	
BMAC = Bridgeton Municipal Athletic Complex.	
The analysis was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be broad/high.	
U-238 = Uranium-238	
Tb-236 = Thorium-236	
The analysis was analyzed for, but was not detected above the reported sample quantitation limit.	
Ra-226 = Radium-226	
Pb-210 = Lead-210	
U-234 = Uranium-234	
Zr-91 = Zirconium-91	
Th-232 = Thorium-232	
The analysis was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.	

Bridgeton Municipal Athletic Complex (BMAC)  
Bridgeton, Missouri

Figure 3  
BMAC Soil Sampling Summary





Source: ESRI Imagery Basemap, 2014  
CHAMBERS/DOOLIN/PRINTER/PROJECT/Project\_Plan.xls

Sample Information	Sample ID	Sample Date	U-238	Th-234	Ra-226	Pb-210
<b>Blanchette Park Composite Samples (n=10)</b>						
Blanchette-Soil-1	5/22/14	0.659	0.968	1.29	3.34 U	
Blanchette-Soil-2	5/22/14	0.659	0.968	1.16	2.65 U	
Blanchette-Soil-3	5/22/14	0.613	0.986	1.15	1.53 U	
Blanchette-Soil-4	5/22/14	0.541	0.772	1.14	0.329 U	
Blanchette-Soil-5	5/22/14	0.267	0.578	1.14	0.329 U	
Blanchette-Soil-6	5/22/14	0.267	0.578	1.08	1.12 U	
Blanchette-Soil-7	5/22/14	0.843	0.836	0.975	0.402 U	
Blanchette-Soil-8	5/22/14	0.819	0.769	1.09	1.06 U	
Blanchette-Soil-9	5/22/14	0.549	0.754	1.01	1.47 U	
Blanchette-Soil-10	5/22/14	0.549	0.754	0.843	0.713 U	
Blanchette-Soil-11	5/22/14	0.641	0.871	1.01	1.83 U	
Blanchette-Soil-12	5/22/14	0.520	0.764	0.804	2.50 U	
<b>Koch Park Composite Samples (n=10)</b>						
Koch-Soil-1	5/22/14	0.610	0.908	1.19	3.79	
Koch-Soil-2	5/22/14	0.610	0.908	1.19	2.14 U	
Koch-Soil-3	5/22/14	0.664	1.16	1.19	3.34 U	
Koch-Soil-4	5/22/14	0.613	0.947	1.32	4.12	
Koch-Soil-5	5/22/14	0.523	1.19	1.30	1.53 U	
Koch-Soil-6	5/22/14	0.523	0.974	1.32	4.12	
Koch-Soil-7	5/22/14	0.555	1.03	1.30	6.72 U	
Koch-Soil-8	5/22/14	0.329	1.22	1.34	2.17 U	
Koch-Soil-9	5/22/14	0.667	0.964	0.96	2.77	
Koch-Soil-10	5/22/14	0.686	0.964	1.65	2.74 U	
Koch-Soil-11	5/22/14	0.635	1.12	1.25	4.08 U	
Koch-Soil-12	5/22/14	0.635	0.934	1.25	1.04 U	

<b>Notes:</b>
Indicates isotope analyzed via alpha spectrometry.
Unmarked isotopes were analyzed via gamma
The analysis was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.
U-238
Lead-210
Ra-226
Ra-228
Th-230
Thorium-230
The analysis was analyzed for, but was not detected above the reported sample quantitation limit.
U-238

Bridgeton Municipal Athletic Complex (BMAC)  
Bridgeton, Missouri

Figure 4  
Reference Area Soil Sampling Summary



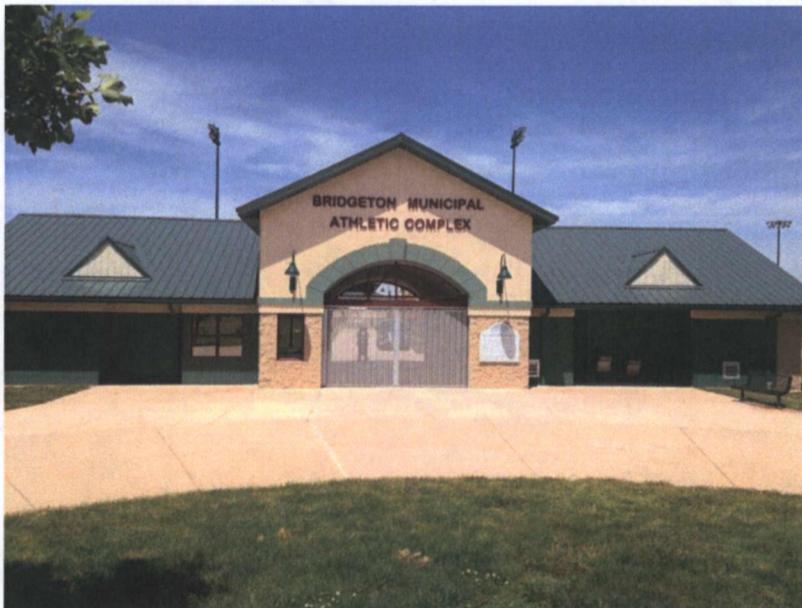
Date: 7/20/2014 Drawn By: Colee Wilts Project No: 103X902514.00002.032

**APPENDIX B**  
**PHOTOGRAPHIC DOCUMENTATION**

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: North	DESCRIPTION	This photograph shows the entrance sign at the Bridgeton Municipal Athletic Complex (BMAC).	1
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/23/2014



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: North	DESCRIPTION	This photograph shows the BMAC entry building.	2
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/23/2014

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023 Direction: Northwest	DESCRIPTION	This photograph shows the southwest portion of BMAC looking northwest.	3
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/23/2014

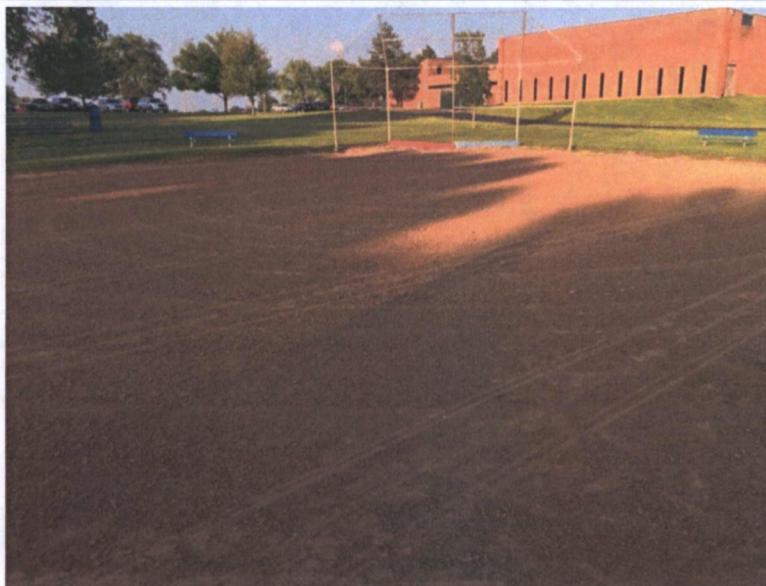


TETRA TECH PROJECT NO. 103X9025140002.023 Direction: North	DESCRIPTION	This photograph shows the southwest parking lot.	4
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/23/2014

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: East	DESCRIPTION	This photograph shows a baseball field at Blanchette Park where reference samples were collected. Analytical data from reference area samples was used to calculate a 95 percent upper confidence limit (UCL) for each radionuclide to represent Naturally Occurring Radioactive Material (NORM).	5  Date 5/21/2014
	CLIENT	U.S. Environmental Protection Agency Region 7	
	PHOTOGRAPHER	Danny O'Connor	



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: Southeast	DESCRIPTION	This photograph shows the area of Koch Park where reference area soil samples were collected.	6  Date 5/19/2014
	CLIENT	U.S. Environmental Protection Agency Region 7	
	PHOTOGRAPHER	Colin Willits	

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows the three gross gamma survey setups used to conduct the gross gamma survey at BMAC and the reference areas.	7
Direction: North	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/21/2014

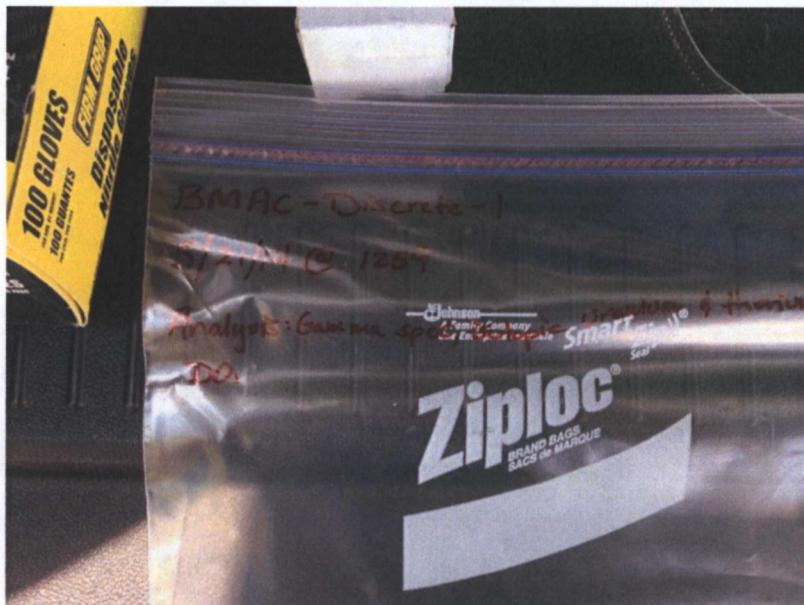


TETRA TECH PROJECT NO. 103X9025140002.023	DESCRIPTION	This photograph shows field personnel conducting a gross gamma survey near the southeast BMAC parking lot.	8
Direction: North	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/21/14

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023 Direction: NA	DESCRIPTION	This photograph shows soil sampling supplies, including bags, gloves, and spoons.	9
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/22/2014



TETRA TECH PROJECT NO. 103X9025140002.023 Direction: NA	DESCRIPTION	This photograph shows a labeled sampling bag. Sample aliquots were transferred directly to their sampling bag.	10
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/22/2014

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: NA	DESCRIPTION	This photograph shows personnel collecting one aliquot of a composite soil sample from a grassy area of BMAC. Composite soil samples consisted of five aliquots of equal mass spread evenly across the Decision Unit (DU).	11  Date  5/23/2014
	CLIENT	U.S. Environmental Protection Agency Region 7	
	PHOTOGRAPHER	Danny O'Connor	



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: NA	DESCRIPTION	This photograph shows personnel collecting a composite soil sample from a reference area, Koch Park.	12  Date  5/22/2014
	CLIENT	U.S. Environmental Protection Agency Region 7	
	PHOTOGRAPHER	Danny O'Connor	

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: NA	DESCRIPTION	This photograph shows a discrete soil sample collected from BMAC. START collected 11 discrete samples collocated with samples collected by the community group.	13
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/22/2014



TETRA TECH PROJECT NO. 103X9025140002.023  Direction: NA	DESCRIPTION	This photograph shows a discrete soil sample, BMAC-Discrete-04, collected near a culvert at BMAC.	14
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Danny O'Connor	5/22/2014

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023 Direction: NA	DESCRIPTION	This photograph shows soil samples being prepared for delivery to TestAmerica Laboratories, LLC.	15
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/23/2014

**Pre-CERCLIS Screening at the Bridgeton Municipal Athletic Complex  
Bridgeton, Missouri**



TETRA TECH PROJECT NO. 103X9025140002.023 Direction: NA	DESCRIPTION	This photograph shows soil samples being prepared for delivery to TestAmerica Laboratories, LLC.	15
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	Colin Willits	5/23/2014

**APPENDIX C**

**LOG BOOK**

2

- 5-19-14 BMAC Pre-CERCLIS screening
- 0745 STMS Danny O'Connor & Colin Willits lead rental vehicle and depart from site.
- 1230 Arrive @ site STMS True. Site on site.
- Meet with Bridgeton, MO officials to discuss site uses
  - Provided map of site
  - South side of park built in mid 70s
  - major expansion 99-02 to add north fields
  - Parks crew will write up summary of site history
- Meet with EPA, Campbell and local citizens that collected samples from BMAC (Dawn Chapman, City Councilman Randy Hein, Dawn, Dakin, & Coach)
- Discuss site activities
- Concerned citizens concerned about background concentrations
- Want samples taken outside West Lake Area - Cliff Cave Park suggested for background
  - Want EPA to contact FUSRAP
  - EPA Maher discussing scanning

3

- 5-19-14 BMAC Pre-CERCLIS screening process of surface soils
- Concerned about Thorium-230
  - 38.77836 -90.43125
  - 38.77836 -90.43129
  - South drainage ditch sampling locations
  - 11 total samples collected by citizens
  - Field #1 between home and golf course area
  - Total Gamma: 190 Bq/m<sup>2</sup> → 5.13 PCU
  - Bridgeton Parks official
  - Door code 1313
- 1740 Arrive @ Koch Park in fluorescent, MO to collect background readings
- Run all three FUSRAP systems over grass areas and infied dirt.
- No readings collected from ditch.
- 1915 Complete background screening
- 1950 Arrive back @ West Lake Field trailer
- 2045 Depart site. End day

D. O'Conor  
5-19-14

Alt 2000 ft

4  
5-20-14 BMAC Pre-CERCLIS screening

- 0600 STMS O'Connor and Willits arrive on site, STM Benz on site.  
 Weather: Sunny mid to upper 80s.  
 - Will complete surface scan of soils @ Koch Park then move to BMAC to begin surface soil scanning of gross gamma radiation with Ludlum 2221 ratemeter with 44-20 detector.
- 0713 Arrive @ Koch Park. Complete background survey of grass & dirt.
- 0839 Arrive @ BMAC, STMS O'Connor & Willits work as Team 3 on gross gamma survey.
- 1200 Lunch
- 1243 Continue FAST survey of north areas
- 1852 Drop off equipment @ West Lake office trailer
- 1910 STMS depart site. End day

14  
5-20 Downing C.

5  
5-21-14 BMAC Pre-CERCLIS screening

- 0700 STMS O'Connor & Willits arrive @ West Lake Field Trailer, STM Benz on site.  
 Weather: Sunny & hot. High 91°F, 30% chance of afternoon storms.  
 - Will collect reference area data from Blanchet park and continue surface soil assessment of BMAC.
- 0745 Arrive @ Blanchette Park.  
 - Collect reference gross gamma readings using FAST.
- 0929 Arrive @ BMAC, begin FAST survey
- 1200 Lunch
- 1249 STM O'Connor arrives in southwest parking lot to collect discrete soil samples from same location as Bridgeton citizens.
- 1259 BMAC - Discrete - 1  
 38.77782, -90.43053
- 1310 BMAC - Discrete - 3  
 38.77777, -90.43070
- 1325 BMAC - Discrete - 4  
 38.77824, -90.43136
- 1335 BMAC - Discrete - 2  
 38.77868, -90.43040

Site in use

5-21-14 BMAC Fix + Discrete Sampling

1355 BMAC - Discrete -10

38.77963, -90.43098

1400 BMAC - Discrete -9

38.77953, -90.43041

1420 BMAC - Discrete -8

38.77936, -90.43054

1435 BMAC - Discrete -7<sup>200</sup>

38.77835, -90.42966

1448 BMAC - Discrete -5

38.77779, -90.42970

1455 BMAC - Discrete -6

38.77790, -90.42923

1501 BMAC - Discrete -7

38.77872, -90.42991

1520 Prep COC Rain delay in survey

STM Wilkins and O'Connor continue

surface soil scan on steep slope

on southeast hill along

- Readings consistently above background  
(18-21 Kepin). Check over already

surveyed, readings similar to southeast  
hill. Rain may have caused elevated  
readings - Radon concentrations by rain

1820 STM Wilkins, O'Connor, and Blaz depart

Danny O.

5-21-14

5-22-14 BMAC Fix + Discrete Sampling

0720 STM O'Connor, STM Wilkins, and Danny O.

site. STM Blaz also site,

Weather: 83°F with 30% chance of  
afternoon storms

- Planned activities include: Finishing  
FAST survey and sampling @ reference  
areas and BMAC

0800 STM O'Connor, EPA Mahler, and EPA Campbell

work to finish FAST survey of southeast  
hillside

0920 All FAST survey for Team 3 is complete.

STM Benz continues FAST survey in  
central area of complex

1030 STM O'Connor and EPA Mahler depart

for Koch Park

1048 Arrive @ Koch Park, prep. to collect  
dirt and grass samples

1054 Collect Koch-Soil-1

1102 Collect Koch-Soil-2

1105 Collect Koch-Soil-3

1109 Collect Koch-Soil-4

1114 Collect Koch-Soil-5

1118 Collect Koch-Soil-6

Grass - 1

1123 Collect Koch-Soil-7

B.O.

STM Wilkins

5-22-14	BMAC Pre-Census Screening
1130	Collect Koch-Grass-2
1135	Collect Koch-Grass-3
1141	Collect Koch-Grass-4
1147	Collect Koch-Grass-5
1150	Collect Koch-Grass-6
	Use Victoreen Model 451 ion-chamber to collect dose readings
	- Check with 5μSv Co-137 (4.5 μSv/hr) read 4.6 μSv/hr
	Readings:
	0.08
	0.08 - 0.13 μSv/hr
	0.0
	38.80781, -90.36276
	0.07 - 0.15 μSv/hr
	38.80777, -90.36280
	0.07 - 0.16 μSv/hr
	38.80791, -90.36240
1225	Arrive back @ BMAC
	Complete CoC
	- STM will be working on Arapad application for soil sampling @ BMAC and Blanchette Park
1320	Arrive @ Blanchette Park
1331	Collect Blanchette-Soil-1
1340	Collect Blanchette-Soil-2

5-23-14	Pilot of e-CERevo Screening
1345	Collect Blanchette-Soil-3
1350	Collect Blanchette-Soil-4
1355	Collect Blanchette-Soil-5
1400	Collect Blanchette-Soil-6
1408	Collect Blanchette-Grass-1
1415	Collect Blanchette-Grass-2
1425	Collect Blanchette-Grass-3
1430	Collect Blanchette-Grass-4
1435	Collect Blanchette-Grass-5
1445	Collect Blanchette-Grass-6
1507	Collect dose reading BLANCHETTE Park Victoreen Model 451 05-RAD 451P-K
	• 0.07 μSv/hr to 0.14 μSv/hr GPS 38.79867 N x 90.48383 W
	• 0.07 μSv/hr to 0.15 μSv/hr GPS 38.79852 N x 90.48325 W
1525	Arrive back @ BMAC. Finish CoC.
1605	Test American picks up samples
1700	STM O'Connor departs site
1730	STM W.H.'s departs site

Dating  
5-22-14

Page 10

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## 5-23-14 BMAC Pre-CERCLIS screening

- 0657 STM O'Connor & Willets arrive on site.  
 STM Binz already on site.  
 Weather: 79°F & sunny  
 - Will complete surface soil sampling  
 @ BMAC  
 STM O'Connor & EPA Campbell begin sampling as team A  
 0745 BMAC-Grass-29  
 0752 BMAC-Grass-30  
~~D.O.~~  
 0805 BMAC-Grass-28  
 0815 BMAC-Soil-30  
 0825 BMAC-Soil-29  
 0832 BMAC-Soil-28  
 0835 BMAC-Soil-27  
 0840 BMAC-Soil-26  
 0845 BMAC-~~Soil~~<sup>Grass</sup> 25  
 0857 BMAC-Grass-24  
 0903 BMAC-Soil-21  
 0907 BMAC-Soil-23  
 0912 BMAC-Soil-22  
 0918 BMAC-Soil-25. Playground area has mulch to > 1' bgs. Will collect surface mulch sample  
 0925 BMAC-Soil-24. Also mulch

11

## 5-23-14 BMAC Pre-CERCLIS screening

- 0932 BMAC-Soil-20  
 0934 BMAC-Soil-19  
 0940 BMAC-Grass-20  
 0947 BMAC-Grass-19  
 1000 BMAC-Grass-12  
 1008 BMAC-Soil-15  
 1023 BMAC-Grass-13  
 1035 BMAC-Grass-18  
 1045 BMAC-Grass-22  
 1100 BMAC-Soil-17  
 1105 BMAC-Soil-16  
 1108 BMAC-Soil-18  
 1150 EPA Campbell & Mahler meet with city administrators to give site update  
 - EPA Campbell shares powerpoint with group  
 - 68 acres → more than 600 site points  
 City concerns  
 - July 4th - will they have results by  
 Friday?  
 - 21-day ingrowth process explained by  
 EPA Mahler  
 - Waste concentration at West Lake  
 - Analysis will look for radionuclides.

Ridgeview Ranch

12

5-23-74 BMAC Pre-CERCLIS Screening  
specific to West Lake (Re-226, Th-230, Ch-332).

-Explains Gamma scan @ BMAC

correlates with reference areas

EPA maintains position that all scientific information indicates BMAC

is suitable for use.

-City wants EPA to release statement

-Prep sampler for lab

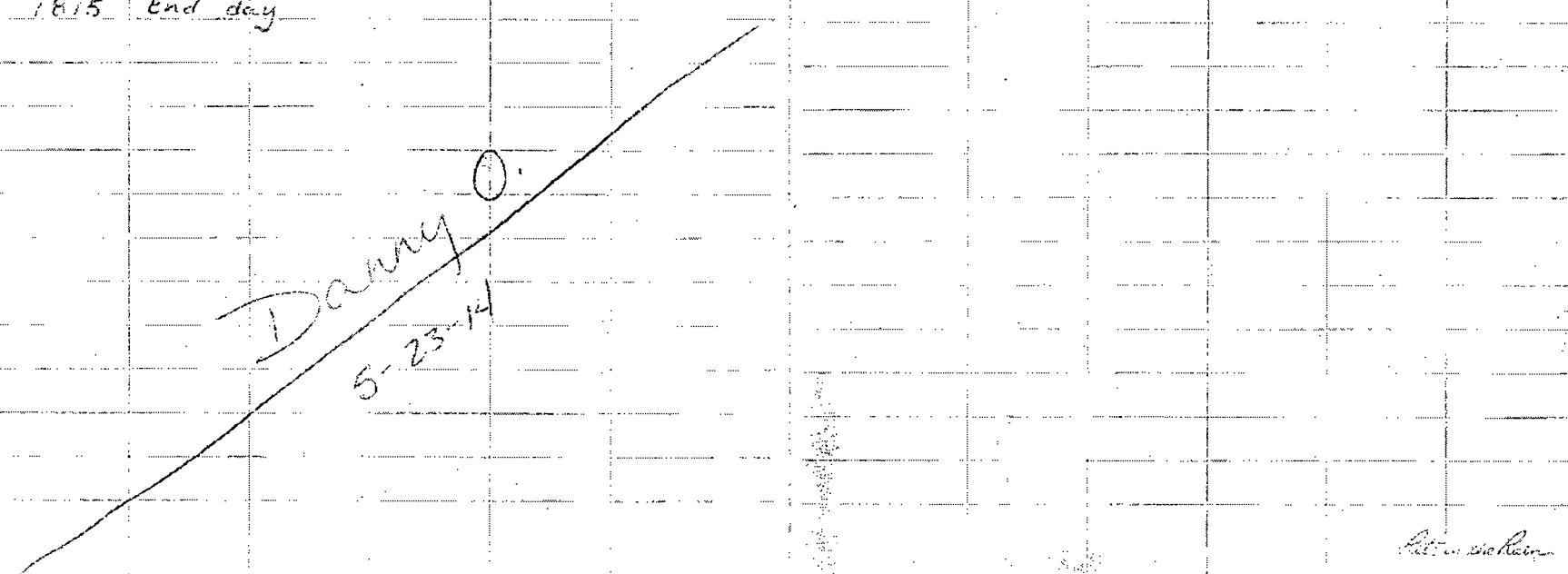
1340 Test America picks up samples

STM Williams and O'Connor depart for KC STM Zinc found site

1750 Arrive in Kansas City. Unload vehicle

1815 End day

13



John Michael

5-23-14	BMAC	BMAC	BMAC
- STM Willets, STM Bire and OSC Maher begin sampling Team B area			
- 0743 collected	BMAC-SOIL-11	- 0958 collected	BMAC-GRASS-26
- 0747 collected	BMAC-SOIL-9	- 10:03 collected	BMAC-GRASS-27
- 0752 collected	BMAC-GRASS-14	- 10:16 collected	BMAC-GRASS-21
- 0805 collected	BMAC-GRASS-16	- 10:19 collected	BMAC-GRASS-17
- 0817 collected	BMAC-SOIL-14	- 10:26 collected	BMAC-GRASS-15
- 0821 collected	BMAC-SOIL-12	- 10:36 collected	BMAC-GRASS-11
- 0826 collected	BMAC-SOIL-10	- 10:44 collected	BMAC-GRASS-4
- 0829 collected	BMAC-SOIL-13	- 10:47 collected	BMAC-GRASS-2 CW
- 0838 collected	BMAC-SOIL-8	- 10:51 collected	BMAC-GRASS-3
- 0841 collected	BMAC-SOIL-7	- 10:57 collected	BMAC-GRASS-2
- 0844 collected	BMAC-GRASS-9	- 11:02 collected	BMAC-GRASS-1
- 0858 collected	BMAC-GRASS-6	- 11:06 collected	BMAC-GRASS-5
- 0907 collected	BMAC-SOI-1	- 11:29 collected	BMAC-GRASS-7
- 0913 collected	BMAC-SOIL-3	- 11:33 collected	BMAC-GRASS-10
- 0928 collected	BMAC-GRASS-8	- 11:44 collected	BMAC-OUTFALL-17
- 0933 collected	BMAC-SOIL-5	- 11:49 collected	BMAC-OUTFALL-18
- 0935 collected	BMAC-SOIL-4	- 12:03 collected	BMAC-OUTFALL-16
- 0939 collected	BMAC-SOIL-6	encountered non-native material	BMAC-OUTFALL-14
- 0942 collected	BMAC-SOIL-2 CW	in sample	BMAC-OUTFALL-14
- 0952 collected	BMAC-GRASS-23	- 12:12 collected	BMAC-OUTFALL-13 CW
		12:12 collected	BMAC-OUTFALL-11

Rosemarie

5-23-14 BMAC  
- 12:24 collected BMAC-OUTFALL-2  
- 12:40 collected BMAC-OUTFALL-3  
- 12:42 collected BMAC-OUTFALL-4  
- 12:47 collected BMAC-OUTFALL-9  
- 12:51 collected BMAC-OUTFALL-8  
- 12:55 collected BMAC-OUTFALL-7  
- 12:59 collected BMAC-OUTFALL-6  
- 13:02 collected BMAC-OUTFALL-5  
- 13:09 collected BMAC-OUTFALL-19  
- 13:11 collected BMAC-OUTFALL-28  
- 13:15 sampling complete  
- 13:56 demobilize from site

C. Willits  
5-23-14

Rita de la Rosa

**APPENDIX D**  
**INSTRUMENT CALIBRATION AND DAILY CHECK SOURCE RECORDS**

**RSSI****CERTIFICATE OF CALIBRATION**

6312 West Oakton Street  
Morton Grove, IL 60053-2723  
Telephone: 847-965-1999  
Fax: 847-965-1991  
[www.rssi.us](http://www.rssi.us)

**Certificate No. 048602**

US EPA

Attention: Eugene Jablonowski  
77 W. Jackson Blvd.  
Chicago, IL 60604

Manufacturer: LUDLUM  
Model: 2221  
Serial No.: 105939  
Probe(s): LUDLUM 44-20, Sn: PR334952

**CALIBRATION DATA**

SOURCE*	SCALE	FIELD ( cpm )	READING ( cpm )	FIELD ( cpm )	READING ( cpm )
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1000	100 K	100 K	400 K	400 K
5	Log	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	225 K
	Scaler	counts	counts	counts	counts
5	0 - 1 K	50	*	500	*
5	0 - 100 K	5 K	*	50 K	*
5	0 - 1 M	500 K	*		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Cs-137      Reading: 150 kcpm

Temperature: 21.5 °C      Relative Humidity: 45 %      Barometric Pressure: 998 mbar

Comments: 0.1 mR = 288 kcpm, 0.15 mR/hr = 405 kcpm

\* The scaler has not been calibrated, because the count time switch is not working properly.

Calibrated by: Timothy Hall      Date: 5/14/14

Calibration Frequency: Annual      Recalibrate by: 5/14/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100	500	
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.

Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

**PREVENTIVE MAINTENANCE PERFORMED**

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	984 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

**REPAIR AND PART INFORMATION**

Quantity	Description

Repair Time: \_\_\_\_\_ hours

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Lab Reference: 23

**RSSI****CERTIFICATE OF CALIBRATION**

6312 West Oakton Street  
Morton Grove, IL 60053-2723  
Telephone: 847-965-1999  
Fax: 847-965-1991  
[www.rssi.us](http://www.rssi.us)

**Certificate No. 048600****US EPA**

Attention: Eugene Jablonowski  
77 W. Jackson Blvd.  
Chicago, IL 60604

**Manufacturer:** LUDLUM  
**Model:** 2221  
**Serial No.:** 106667  
**Probe(s):** LUDLUM 44-20, Sn: PR334950

**CALIBRATION DATA**

SOURCE*	SCALE	FIELD ( cpm )	READING ( cpm )	FIELD ( cpm )	READING ( cpm )
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1K	100 K	100 K	400 K	400 K
5	Log Scale	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	250 K
	SCALER	counts	counts	counts	counts
5	0 - 1K	50	51	500	503
5	0 - 100K	5 K	5032	50 K	50355
5	0 - 1M	500 K	503534		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

**Check Source:** Cs-137    **Reading:** 146 kcpm

**Temperature:** 23.5 °C    **Relative Humidity:** 54 %    **Barometric Pressure:** 986 mbar

**Comments:** 0.1 mR/hr = 310 kcpm  
0.15 mR/hr = 406 kcpm

**Calibrated by:** Timothy Hall    **Date:** 5/12/14

**Calibration Frequency:** Annual    **Recalibrate by:** 5/12/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100	500	
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.

Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

**PREVENTIVE MAINTENANCE PERFORMED**

BATTERIES/CONTACTS CHECKED	✓	REPLACED
HIGH VOLTAGE MEASURED	✓	907 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

**REPAIR AND PART INFORMATION**

Quantity	Description
4	D Batteries

Lab Reference: 7

**RSSI****CERTIFICATE OF CALIBRATION**

6312 West Oakton Street  
Morton Grove, IL 60053-2723  
Telephone: 847-965-1999  
Fax: 847-965-1991  
[www.rssi.us](http://www.rssi.us)

**Certificate No. 048601**

US EPA  
Attention: Eugene Jablonowski  
77 W. Jackson Blvd.  
Chicago, IL 60604

Manufacturer: LUDLUM  
Model: 2221  
Serial No.: 102047  
Probe(s): LUDLUM 44-20, Sn: PR205404

**CALIBRATION DATA**

SOURCE*	SCALE	FIELD	READING	FIELD	READING
5	x1	100	100	400	400
5	x10	1 K	1 K	4 K	4 K
5	x100	10 K	10 K	40 K	40 K
5	x1K	100 K	100 K	400 K	400 K
5	Log Scale	250	250	2.5 K	2.5 K
5		25 K	25 K	250 K	250 K
	SCALER	counts	counts	counts	counts
5	0 - 1K	50	50	500	504
5	0 - 100 K	5 K	5037	50 K	50369
5	0 - 1 M	500 K	503586		

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Cs-137      Reading: 129 kcpm

Temperature: 23 °C      Relative Humidity: 63 %      Barometric Pressure: 984 mbar

Comments: 0.1 mR/hr = 255 kcpm  
0.15 mR/hr = 359 kcpm

Calibrated by: Timothy Hall      Date: 5/13/14

Calibration Frequency: Annual

Recalibrate by: 5/13/15

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham	LUDLUM	
Model	CCs-D-20E	64-764	AMC 13446	100		500
Serial Number	69036EZ	722	7510 LA	FTC-CF-001	32789	
Activity	15 Ci	100 mCi	100 mCi	1801 µg	NONE	
Date	4/2009	5/2/78	6/3/84	10/8/85	11/18/09	

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.

Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

**PREVENTIVE MAINTENANCE PERFORMED**

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	1056 VOLTS
SENSITIVITY MEASURED	✓	20 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

Lab Reference: 16

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**

**TEAM 1 Configuration**

<b>Instrument</b>	<b>Model</b>	<b>Serial #</b>
<b>Meter</b>	Ludlum 2221	105939
<b>Detector</b>	Ludlum 44-10	PR334952
<b>Check Source</b>	0.25 uCi	161
<b>HV</b>	1000	
<b>Threshold</b>	100	
<b>Window</b>	4030	

**BMAC Daily Functional Checks**

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
<b>5/16/2014 at 1140 Initial Willowbrook Warehouse Willowbrook, IL</b>				
1	11,995	91,985	79,990	Initial Check Source Calibration
2	11,021	92,708	81,687	
3	10063	91,631	81,568	
<b>Average</b>	<b>11,026</b>	<b>92,108</b>	<b>81,082</b>	
<b>5/19/2014 at 1440 CST Westlake Landfill Site Trailer</b>				
1	15,201	96,927	81,726	Yes
2	15,322	96,809	81,487	Yes
3	15,132	96,204	81,072	Yes
<b>Average</b>	<b>15,218</b>	<b>96,647</b>	<b>81,428</b>	Yes
<b>5/19/2014 at 2035 CST</b>				
1	15130	95629	80,499	Yes
2	15509	98677	83,168	Yes
3	15601	97773	82,172	Yes
<b>Average</b>	<b>15413</b>	<b>97360</b>	<b>81,946</b>	Yes
<b>5/20/2014 at 0605 CST Westlake Landfill Site Trailer</b>				
1	15270	98212	82,942	Yes
2	15659	97983	82,324	Yes
3	15581	98545	82,964	Yes
<b>Average</b>	<b>15503</b>	<b>98247</b>	<b>82,743</b>	Yes
<b>5/20/2014 at 1915 CST</b>				
1	15499	97473	81,974	Yes
2	15211	90018	74,807	Yes
3	15352	98524	83,172	Yes
<b>Average</b>	<b>15354</b>	<b>95338</b>	<b>79,984</b>	Yes
<b>5/21/2014 at 0730 CST Westlake Landfill Site Trailer</b>				
1	14829	99511	84,682	Yes
2	16008	99207	83,199	Yes
3	14957	99499	84,542	Yes
<b>Average</b>	<b>15265</b>	<b>99406</b>	<b>84,141</b>	Yes

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**  
**TEAM 1 Configuration**

<b>Instrument</b>	<b>Model</b>	<b>Serial #</b>
Meter	Ludlum 2221	105939
Detector	Ludlum 44-10	PR334952
Check Source	0.25 uCi	161
HV	1000	
Threshold	100	
Window	4030	

**BMAC Daily Functional Checks**

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
<b>5/21/2014 at 1820</b>				
1	15566	99877	84,311	Yes
2	15877	98132	82,255	Yes
3	15390	99709	84,319	Yes
<b>Average</b>	<b>15611</b>	<b>99239</b>	<b>83,628</b>	<b>Yes</b>
<b>5/22/2014 at 0730 CST Westlake Landfill Site Trailer</b>				
1	15321	98211	82,890	Yes
2	15001	97556	82,555	Yes
3	15231	97909	82,678	Yes
<b>Average</b>	<b>15184</b>	<b>97892</b>	<b>82,708</b>	<b>Yes</b>
<b>5/22/2014 at 1640 CST</b>				
1	15945	97346	81,401	Yes
2	15328	98445	83,117	Yes
3	15274	97448	82,174	Yes
<b>Average</b>	<b>15516</b>	<b>97746</b>	<b>82,231</b>	<b>Yes</b>

Notes:

%	percent
µCi	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**

**TEAM 2 Configuration**

<b>Instrument</b>	<b>Model</b>	<b>Serial #</b>
Scaler/Ratemeter	Ludlum 2221	106667
Detector	Ludlum 44-10	PR334950
Check Source	0.25 uCi	158
HV	917	
Threshold	101	
Window	3797	

**BMAC Daily Functional Checks**

<b>Reading number</b>	<b>Background measurements (one minute)</b>	<b>Check Source Readings (one minute measurements with source on shelf 1)</b>	<b>Net CPM</b>	<b>Within Operating Limits (+-) 10% of initial calibration?</b>
<b>5/16/2014 at 1240 CST Initial Willowbrook Warehouse</b>				
1	10,525	89,495	78,970	NA
2	10,646	89,577	78,931	
3	10,540	89,884	79,344	
<b>Average</b>	<b>10,570</b>	<b>89,652</b>	<b>79,082</b>	
<b>5/19/2014 at 1440 CST Westlake Landfill Site Trailer</b>				
1	15,175	94,106	78,931	Yes
2	15,170	94,670	79,500	Yes
3	15,174	94,096	78,922	Yes
<b>Average</b>	<b>15,173</b>	<b>94,291</b>	<b>79,118</b>	Yes
<b>5/19/2014 at 2035 CST</b>				
1	15,161	90,538	75,377	Yes
2	15,067	90,984	75,917	Yes
3	15,155	90,965	75,810	Yes
<b>Average</b>	<b>15,128</b>	<b>90,829</b>	<b>75,701</b>	Yes
<b>5/20/2014 at 0605 CST Westlake Landfill Site Trailer</b>				
1	14599	90265	75,666	Yes
2	14507	90579	76,072	Yes
3	14516	90859	76,343	Yes
<b>Average</b>	<b>14541</b>	<b>90568</b>	<b>76,027</b>	Yes
<b>5/20/2014 at 1915 CST</b>				
1	13908	93532	79,624	Yes
2	13801	93275	79,474	Yes
3	13708	93206	79,498	Yes
<b>Average</b>	<b>13806</b>	<b>93338</b>	<b>79,532</b>	Yes
<b>5/21/2014 at 0730 CST Westlake Landfill Site Trailer</b>				
1	13959	92543	78,584	Yes
2	13801	93001	79,200	Yes
3	13900	92409	78,509	Yes
<b>Average</b>	<b>13887</b>	<b>92651</b>	<b>78,764</b>	Yes

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**  
**TEAM 2 Configuration**

Instrument	Model	Serial #
Scaler/Ratemeter	Ludlum 2221	106667
Detector	Ludlum 44-10	PR334950
Check Source	0.25 uCi	158
HV	917	
Threshold	101	
Window	3797	

**BMAC Daily Functional Checks**

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+/- 10% of initial calibration?)
<b>5/21/2014 at 1820 CST</b>				
1	14694	91988	77,294	Yes
2	14533	92202	77,669	Yes
3	14544	93059	78,515	Yes
<b>Average</b>	<b>14590</b>	<b>92416</b>	<b>77,826</b>	<b>Yes</b>
<b>5/22/2014 at 0730 CST Westlake Landfill Site Trailer</b>				
1	14363	92223	77,860	Yes
2	14567	91976	77,409	Yes
3	14345	93004	78,659	Yes
<b>Average</b>	<b>14425</b>	<b>92401</b>	<b>77,976</b>	<b>Yes</b>
<b>5/22/2014 at 1640 CST</b>				
1	14328	93447	79,119	Yes
2	14134	93151	79,017	Yes
3	14301	93249	78,948	Yes
<b>Average</b>	<b>14254</b>	<b>93282</b>	<b>79,028</b>	<b>Yes</b>

Notes:

%	percent
$\mu$ Ci	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**

**TEAM 3 Configuration**

<b>Instrument</b>	<b>Model</b>	<b>Serial #</b>
Scaler/Ratemeter	Ludlum 2221	102047
Detector	Ludlum 44-20	PR205404
Check Source	0.25 uCi	149
HV	1057	
Threshold	100	
Window	4105	

**BMAC Daily Functional Check**

<b>Reading number</b>	<b>Background measurements (one minute)</b>	<b>Check Source Readings (one minute measurements with source on shelf 1)</b>	<b>Net CPM</b>	<b>Within Operating Limits (+-) 10% of initial calibration?</b>
<b>5/16/2014 at 1240 CST Initial Willowbrook Warehouse</b>				
1	7,681	78,348	70,667	N/A
2	7,535	78,248	70,713	
3	7681	78,610	70,929	
<b>Average</b>	<b>7,632</b>	<b>78,402</b>	<b>70,770</b>	
<b>5/19/2014 at 1440 CST Westlake Landfill Site Trailer</b>				
1	10864	78,619	67,755	Yes
2	10858	79,382	68,524	Yes
3	10829	79,243	68,414	Yes
<b>Average</b>	<b>10,850</b>	<b>79,081</b>	<b>68,231</b>	Yes
<b>5/19/2014 at 2035 CST</b>				
1	11088	80,604	69,516	Yes
2	11099	80,913	69,814	Yes
3	11302	81,127	69,825	Yes
<b>Average</b>	<b>11,163</b>	<b>80,881</b>	<b>69,718</b>	Yes
<b>5/20/2014 at 0605 CST Westlake Landfill Site Trailer</b>				
1	10712	80191	69,479	Yes
2	10813	80198	69,385	Yes
3	10578	80251	69,673	Yes
<b>Average</b>	<b>10701</b>	<b>80213</b>	<b>69,512</b>	Yes
<b>5/20/2014 at 1915 CST</b>				
1	10665	80988	70,323	Yes
2	10625	80171	69,546	Yes
3	10382	80349	69,967	Yes
<b>Average</b>	<b>10557</b>	<b>80503</b>	<b>69,945</b>	Yes
<b>5/21/2014 at 0730 CST Westlake Landfill Site Trailer</b>				
1	10001	81002	71,001	Yes
2	10234	80198	69,964	Yes
3	10667	80321	69,654	Yes
<b>Average</b>	<b>10301</b>	<b>80507</b>	<b>70,206</b>	Yes

**U.S. EPA Region 5 Emergency Response Functional Check Sheet**

**TEAM 3 Configuration**

<b>Instrument</b>	<b>Model</b>	<b>Serial #</b>
Scaler/Ratemeter	Ludlum 2221	102047
Detector	Ludlum 44-20	PR205404
Check Source	0.25 uCi	149
HV	1057	
Threshold	100	
Window	4105	

**BMAC Daily Functional Check**

Reading number	Background measurements (one minute)	Check Source Readings (one minute measurements with source on shelf 1)	Net CPM	Within Operating Limits (+-) 10% of initial calibration?
5/21/2014 at 1820 CST				
1	10665	80988	70,323	Yes
2	10625	80171	69,546	Yes
3	10382	80349	69,967	Yes
<b>Average</b>	<b>10557</b>	<b>80503</b>	<b>69,945</b>	<b>Yes</b>
5/22/2014 at 0730 CST Westlake Landfill Site Trailer				
1	10001	81002	71,001	Yes
2	10234	80198	69,964	Yes
3	10667	80321	69,654	Yes
<b>Average</b>	<b>10301</b>	<b>80507</b>	<b>70,206</b>	<b>Yes</b>
5/22/2014 at 1640 CST				
1	11382	81002	69,620	Yes
2	11371	80301	68,930	Yes
3	11415	80344	68,929	Yes
<b>Average</b>	<b>11389</b>	<b>80549</b>	<b>69,160</b>	<b>Yes</b>

Notes:

%	percent
$\mu$ Ci	MicroCurie
cpm	Counts per minute
CST	Central Standard Time
HV	High voltage
NA	Not applicable

**APPENDIX E**  
**ANALYTICAL DATA PACK AND CHAIN-OF-CUSTODY DOCUMENTS**

# CHAIN-OF-CUSTODY RECORD



**TETRA TECH EM INC.**  
 8030 Flint Street  
 Lenexa, Kansas 66214  
 (913) 894-2600

Date: 05 21-7 22 - 2014  
 Page: 1 of 2  
 Project No: X902514000Z.023  
 Shipment Method: Courier  
 Number of Coolers Shipped: \_\_\_\_\_

Project Name: <u>BMAC</u>			Analyses (Preservative)						Matrix Type	No. of Containers	Turn-around Time Requested: Standard
Sample Number:	Date:	Time:	Isotopic Strontium	Isotopic Uranium	Isotopic Thorium						
BMAC-Discrete-00	5/21/14	1435	X	X	X				S	1	
BMAC-Discrete-1	5/21/14	1259							S	1	
BMAC-Discrete-2	5/21/14	1335							S	1	
BMAC-Discrete-3	5/21/14	1310							S	1	
BMAC-Discrete-4	5/21/14	1325							S	1	
BMAC-Discrete-5	5/21/14	1448							S	1	
BMAC-Discrete-6	5/21/14	1455							S	1	
BMAC-Discrete-7	5/21/14	1501							S	1	
BMAC-Discrete-8	5/21/14	1420							S	1	
BMAC-Discrete-9	5/21/14	1400							S	1	
BMAC-Discrete-10	5/21/14	1355							S	1	
Koch-Soil-1	5/22/14	1054							S	1	
Koch-Soil-2		1102							S	1	
Koch-Soil-3		1105							S	1	
Koch-Soil-4		1109							S	1	
Koch-Soil-5		1114							S	1	
Koch-Soil-6		1118							S	1	
Koch-Grass-1		1123							S	1	
Koch-Grass-2		1130							S	1	
Koch-Grass-3		1135							S	1	
Koch-Grass-4		1141							S	1	
Koch-Grass-5		1147							S	1	
Koch-Grass-6		1150							S	1	
Blanchette-Soil-1	↓	1331	↓	↓	↓				S	1	

Matrix: S = Soil   M = Sediment   W = Water   A = Air

Preservatives: 1 = Ice   2 = HCl   3 = H<sub>2</sub>SO<sub>4</sub>   4 = NaOH   5 = HNO<sub>3</sub>

Relinquished By:	(Signature)	Received By:	(Signature)	Date: <u>5/22/14</u>	Time: <u>1605</u>
Relinquished By:	(Signature)	Received By:	(Signature)	Date: _____	Time: _____
Relinquished By:	(Signature)	Received By:	(Signature)	Date: _____	Time: _____

White = Tetra Tech   Yellow = Laboratory   Pink = Return to Tetra Tech

## **CHAIN-OF-CUSTODY RECORD**



**TETRA TECH EM INC.**  
8030 Flint Street  
Lenexa, Kansas 66214  
(913) 694-2600

Date: 05-21-22-2014  
Page: 2 of 2  
Project No: X9025140002.023  
Shipment Method: Courier  
Number of Coolers Shipped:

Matrix: S = Soil    M = Sediment    W = Water    A = Air

Preservatives: 1 = Ice 2 = HCl 3 =  $H_2SO_4$  4 = NaOH 5 =  $HNO_3$

Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date: 5/22/14	Time: 1605
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

# CHAIN-OF-CUSTODY RECORD



**TETRA TECH EM INC.**  
 8030 Flint Street  
 Lenexa, Kansas 66214  
 (913) 894-2600

Date: 5-23-2014  
 Page: 1 of 4  
 Project No.: X9015140002.023  
 Shipment Method: Cooler  
 Number of Coolers Shipped: 6

Project Name:	Analyses (Preservative)										Matrix Type	No. of Containers	Turn-around Time Requested:
	Isotopic Neut	Isotopic C	Isotopic H	Isotopic N	Isotopic O	Isotopic S	Isotopic Cl	Isotopic Br	Isotopic I	Isotopic F			
Project Manager: <u>Darren O'Connor</u>													
Sampler: <u>SO</u> <i>(Signature)</i>													
Sample Number:	Date:	Time:											Laboratory Comments:
BMAC - Grass - 1	5/23/14	1057	X	X	X						S	I	
BMAC - Grass - 2		1051		1	1								
BMAC - Grass - 3		1047		1	1								
BMAC - Grass - 4		1038		1	1								
BMAC - Grass - 5		1102		1	1								
BMAC - Grass - 6		0858		1	1								
BMAC - Grass - 7		1106		1	1								
BMAC - Grass - 8		0928		1	1								
BMAC - Grass - 9		0844		1	1								
BMAC - Grass - 10		1112		1	1								
BMAC - Grass - 11		1030		1	1								
BMAC - Grass - 12		1000		1	1								
BMAC - Grass - 13		1023		1	1								
BMAC - Grass - 14		0752		1	1								
BMAC - Grass - 15		1020		1	1								
BMAC - Grass - 16		0805		1	1								
BMAC - Grass - 17		1014		1	1								
BMAC - Grass - 18		1035		1	1								
BMAC - Grass - 19		0947		1	1								
BMAC - Grass - 20		0940		1	1								
BMAC - Grass - 21		1010		1	1								
BMAC - Grass - 22		1045		1	1								
BMAC - Grass - 23		0952		1	1								
BMAC - Grass - 24	▼	0857	✓	✓	▼						▼	▼	

Matrix: S = Soil   M = Sediment   W = Water   A = Air

Preservatives: 1 = Ice   2 = HCl   3 =  $H_2SO_4$    4 = NaOH   5 =  $HNO_3$

Relinquished By: <u>SO</u> <i>(Signature)</i>	Received By: <u>BT</u> <i>(Signature)</i>	Date: <u>5/23/14</u>	Time: <u>1340</u>
Relinquished By: <i>(Signature)</i>	Received By: <i>(Signature)</i>	Date: 	Time: 
Relinquished By: <i>(Signature)</i>	Received By: <i>(Signature)</i>	Date: 	Time: 

White = Tetra Tech   Yellow = Laboratory   Pink = Return to Tetra Tech

# CHAIN-OF-CUSTODY RECORD



**TETRA TECH EM INC.**  
 8030 Flint Street.  
 Lenexa, Kansas 66214  
 (913) 894-2600

Date: 5-23-2014  
 Page: 2 of 4  
 Project No: X9025140003.023  
 Shipment Method: Cooler  
 Number of Coolers Shipped: 6

Project Name: <u>BMAC</u>			Analyses (Preservative)						Matrix Type	No. of Containers	Turn-around Time Requested:
Sample Number:	Date:	Time:	Ice	HCl	H <sub>2</sub> SO <sub>4</sub>	NaOH	HNO <sub>3</sub>				
BMAC - Grass - 25	5/23/14	0845							3	1	
BMAC - Grass - 26		0958								1	
BMAC - Grass - 27		1003									
BMAC - Grass - 28		0805									
BMAC - Grass - 29		0745									
BMAC - Grass - 30		0752									
BMAC - Soil - 1		0907									
BMAC - Soil - 2		0711									
BMAC - Soil - 3		0713									
BMAC - Soil - 4		0735									
BMAC - Soil - 5		0733									
BMAC - Soil - 6		0739									
BMAC - Soil - 7		0841									
BMAC - Soil - 8		0838									
BMAC - Soil - 9		0747									
BMAC - Soil - 10		0826									
BMAC - Soil - 11		0743									
BMAC - Soil - 12		0821									
BMAC - Soil - 13		0829									
BMAC - Soil - 14		0817									
BMAC - Soil - 15		1008									
BMAC - Soil - 16		1105									
BMAC - Soil - 17		1100									
BMAC - Soil - 18		1108	✓	✓	✓				✓	✓	

Matrix: S = Soil    M = Sediment    W = Water    A = Air

Preservatives: 1 = Ice    2 = HCl    3 = H<sub>2</sub>SO<sub>4</sub>    4 = NaOH    5 = HNO<sub>3</sub>

Relinquished By:  (Signature)	Received By:  (Signature)	Date: <u>5/23/14</u>	Time: <u>1540</u>
Relinquished By:  (Signature)	Received By:  (Signature)	Date:	Time:
Relinquished By:  (Signature)	Received By:  (Signature)	Date:	Time:

White = Tetra Tech    Yellow = Laboratory    Pink = Return to Tetra Tech

# CHAIN-OF-CUSTODY RECORD



**TETRA TECH EM INC.**  
8030 Flint Street  
Lenexa, Kansas 66214  
(913) 894-2600

Date: 5-23-2014  
Page: 3 of 4  
Project No: X9025140002:023  
Shipment Method: Courier  
Number of Coolers Shipped: 6

Project Name:	BMAC	Analyses (Preservative)										Matrix Type	No. of Containers	Turn-around Time Requested: <i>standard</i>
		1	2	3	4	5	6	7	8	9	10			
Project Manager:	Danny O'Connor													
Sampler:	<i>[Signature]</i>													
Sample Number:	Date:	Time:												Laboratory Comments:
BMAC - Soil - 19	5-23-14	0731	X	X	X							S	1	
BMAC - Soil - 20		0932												
BMAC - Soil - 21		0905												
BMAC - Soil - 22		0912												
BMAC - Soil - 23		0907												
BMAC - Soil - 24		0925												
BMAC - Soil - 25		0919												
BMAC - Soil - 26		0840												
BMAC - Soil - 27		0835												
BMAC - Soil - 28		0832												
BMAC - Soil - 29		0825												
BMAC - Soil - 30		0815												
BMAC - Outfall - 2		1224												
BMAC - Outfall - 3		1240												
BMAC - Outfall - 4		1242												
BMAC - Outfall - 5		1302												
BMAC - Outfall - 6		1259												
BMAC - Outfall - 7		1253												
BMAC - Outfall - 8		1251												
BMAC - Outfall - 9		1247												
BMAC - Outfall - 10		1243												
BMAC - Outfall - 11		1212												
BMAC - Outfall - 14		1149												
BMAC - Outfall - 15		1144	✓	✓	✓							✓	✓	

Matrix: S = Soil   M = Sediment   W = Water   A = Air

Preservatives: 1 = Ice   2 = HCl   3 =  $H_2SO_4$    4 = NaOH   5 =  $HNO_3$

Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date: <u>5/23/14</u>	Time: <u>1340</u>
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:

White = Tetra Tech   Yellow = Laboratory   Pink = Return to Tetra Tech

# CHAIN-OF-CUSTODY RECORD



**TETRA TECH EM INC.**  
8030 E 31st Street  
Lenexa, Kansas 66214  
(913) 894-2600

Date: 5-23-2014  
Page: 4 of 11  
Project No: X9025140002.023  
Shipment Method: Courier  
Number of Coolers Shipped: 6

Matrix: S = Soil M = Sediment W = Water A = Air

Preservatives: 1 = Ice 2 = HCl 3 =  $H_2SO_4$  4 = NaOH 5 =  $HNO_3$

Relinquished By: <i>(Signature)</i>	Received By: <i>(Signature)</i>	Date: 5/23/04	Time: 1340
Relinquished By: <i>(Signature)</i>	Received By: <i>(Signature)</i>	Date:	Time:
Relinquished By: <i>(Signature)</i>	Received By: <i>(Signature)</i>	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

1

2

3

4

5

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12

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

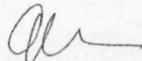
## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-6793-1  
Client Project/Site: Bridgeton Municipal Athletic Complex

For:  
Tetra Tech EM Inc.  
415 Oak Street  
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher



---

Authorized for release by:  
6/22/2014 6:53:21 AM

Erika Gish, Project Manager II  
(314)298-8566  
erika.gish@testamericainc.com

### LINKS

Review your project  
results through

Total Access

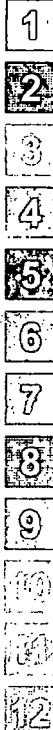
Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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## Case Narrative

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Job ID: 160-6793-1**

**Laboratory: TestAmerica St. Louis**

Narrative

### CASE NARRATIVE

**Client: Tetra Tech EM Inc.**

**Project: Bridgeton Municipal Athletic Complex**

**Report Number: 160-6793-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### RECEIPT

The samples were received on 5/23/2014 1:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 8 coolers at receipt time were 21.0° C, 21.0° C, 21.0° C, 21.0° C, 21.0° C, 21.0° C, 21.0° C and 21.0° C.

#### ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2

## Case Narrative

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

### Job ID: 160-6793-1 (Continued)

#### Laboratory: TestAmerica St. Louis (Continued)

(160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30 (160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29 (160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R\_Th. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/27/2014, 05/29/2014 and 06/03/2014 and analyzed on 05/30/2014, 06/02/2014, 06/05/2014, 06/09/2014, 06/10/2014, 06/11/2014, 06/12/2014, 06/13/2014 and 06/18/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: (160-6793-1 DU), BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-10 (160-6793-11), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2 (160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2 (160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30

## Case Narrative

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

### Job ID: 160-6793-1 (Continued)

#### Laboratory: TestAmerica St. Louis (Continued)

(160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29 (160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/27/2014 and 05/29/2014 and analyzed on 05/30/2014, 06/02/2014, 06/05/2014, 06/09/2014 and 06/12/2014.

Samples contain rocks and are not homogeneous. Possible matrix interference: (160-6793-1 DU), BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-10 (160-6793-11), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), (160-6793-21 DU), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23). KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples BMAC-DISCRETE-00 (160-6793-1), BMAC-DISCRETE-1 (160-6793-2), BMAC-DISCRETE-2 (160-6793-3), BMAC-DISCRETE-3 (160-6793-4), BMAC-DISCRETE-4 (160-6793-5), BMAC-DISCRETE-5 (160-6793-6), BMAC-DISCRETE-6 (160-6793-7), BMAC-DISCRETE-7 (160-6793-8), BMAC-DISCRETE-8 (160-6793-9), BMAC-DISCRETE-9 (160-6793-10), BMAC-DISCRETE-10 (160-6793-11), KOCH-SOIL-1 (160-6793-12), KOCH-SOIL-2 (160-6793-13), KOCH-SOIL-3 (160-6793-14), KOCH-SOIL-4 (160-6793-15), KOCH-SOIL-5 (160-6793-16), KOCH-SOIL-6 (160-6793-17), KOCH-GRASS-1 (160-6793-18), KOCH-GRASS-2 (160-6793-19), KOCH-GRASS-3 (160-6793-20), KOCH-GRASS-4 (160-6793-21), KOCH-GRASS-5 (160-6793-22), KOCH-GRASS-6 (160-6793-23), BLANCHETTE-SOIL-1 (160-6793-24), BLANCHETTE-SOIL-2 (160-6793-25), BLANCHETTE-SOIL-3 (160-6793-26), BLANCHETTE-SOIL-4 (160-6793-27), BLANCHETTE-SOIL-5 (160-6793-28), BLANCHETTE-SOIL-6 (160-6793-29), BLANCHETTE-GRASS-1 (160-6793-30), BLANCHETTE-GRASS-2 (160-6793-31), BLANCHETTE-GRASS-3 (160-6793-32), BLANCHETTE-GRASS-4 (160-6793-33), BLANCHETTE-GRASS-5 (160-6793-34), BLANCHETTE-GRASS-6 (160-6793-35), BMAC-GRASS-1 (160-6793-36), BMAC-GRASS-2 (160-6793-37), BMAC-GRASS-3 (160-6793-38), BMAC-GRASS-4 (160-6793-39), BMAC-GRASS-5 (160-6793-40), BMAC-GRASS-6 (160-6793-41), BMAC-GRASS-7 (160-6793-42), BMAC-GRASS-8 (160-6793-43), BMAC-GRASS-9 (160-6793-44), BMAC-GRASS-10 (160-6793-45), BMAC-GRASS-11 (160-6793-46), BMAC-GRASS-12 (160-6793-47), BMAC-GRASS-13 (160-6793-48), BMAC-GRASS-14 (160-6793-49), BMAC-GRASS-15 (160-6793-50), BMAC-GRASS-16 (160-6793-51), BMAC-GRASS-17 (160-6793-52), BMAC-GRASS-18 (160-6793-53), BMAC-GRASS-19 (160-6793-54), BMAC-GRASS-20 (160-6793-55), BMAC-GRASS-21 (160-6793-56), BMAC-GRASS-22 (160-6793-57), BMAC-GRASS-23 (160-6793-58), BMAC-GRASS-24 (160-6793-59), BMAC-GRASS-25 (160-6793-60), BMAC-GRASS-26 (160-6793-61), BMAC-GRASS-27 (160-6793-62), BMAC-GRASS-28 (160-6793-63), BMAC-GRASS-29 (160-6793-64), BMAC-GRASS-30 (160-6793-65), BMAC-SOIL-1 (160-6793-66), BMAC-SOIL-2 (160-6793-67), BMAC-SOIL-3 (160-6793-68), BMAC-SOIL-4 (160-6793-69), BMAC-SOIL-5 (160-6793-70), BMAC-SOIL-6 (160-6793-71), BMAC-SOIL-7 (160-6793-72), BMAC-SOIL-8 (160-6793-73), BMAC-SOIL-9 (160-6793-74), BMAC-SOIL-10 (160-6793-75), BMAC-SOIL-11 (160-6793-76), BMAC-SOIL-12 (160-6793-77), BMAC-SOIL-13 (160-6793-78), BMAC-SOIL-14 (160-6793-79), BMAC-SOIL-15 (160-6793-80), BMAC-SOIL-16 (160-6793-81), BMAC-SOIL-17 (160-6793-82), BMAC-SOIL-18 (160-6793-83), BMAC-SOIL-19 (160-6793-84), BMAC-SOIL-20 (160-6793-85), BMAC-SOIL-21 (160-6793-86), BMAC-SOIL-22 (160-6793-87), BMAC-SOIL-23 (160-6793-88), BMAC-SOIL-24 (160-6793-89), BMAC-SOIL-25 (160-6793-90), BMAC-SOIL-26 (160-6793-91), BMAC-SOIL-27 (160-6793-92), BMAC-SOIL-28 (160-6793-93), BMAC-SOIL-29

## Case Narrative

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

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### Job ID: 160-6793-1 (Continued)

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#### Laboratory: TestAmerica St. Louis (Continued)

(160-6793-94), BMAC-SOIL-30 (160-6793-95), BMAC-OUTFALL-2 (160-6793-96), BMAC-OUTFALL-3 (160-6793-97), BMAC-OUTFALL-4 (160-6793-98), BMAC-OUTFALL-5 (160-6793-99), BMAC-OUTFALL-6 (160-6793-100), BMAC-OUTFALL-7 (160-6793-101), BMAC-OUTFALL-8 (160-6793-102), BMAC-OUTFALL-9 (160-6793-103), BMAC-OUTFALL-10 (160-6793-104), BMAC-OUTFALL-11 (160-6793-105), BMAC-OUTFALL-14 (160-6793-106), BMAC-OUTFALL-15 (160-6793-107), BMAC-OUTFALL-16 (160-6793-108), BMAC-OUTFALL-17 (160-6793-109), BMAC-OUTFALL-18 (160-6793-110), BMAC-OUTFALL-19 (160-6793-111) and BMAC-OUTFALL-20 (160-6793-112) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 05/23/2014 and 05/27/2014, prepared on 05/28/2014 and 05/29/2014 and analyzed on 06/19/2014 and 06/20/2014.

Lead-214 analyzed by gamma spectroscopy was detected above the MDA in the blank. Variations in Compton backgrounds and statistical analyses allowed for small area counts in the ROIs of this nuclide. Other Thorium decay chain products are not present in the blank to support Lead 214 identification. The data is reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# CHAIN-OF-CUSTODY RECORD



TETRA TECH EM INC.  
2030 Flint Street  
Lenexa, Kansas 66214  
(913) 894-2600



160-6793 Chain of Custody

Date: 05 21-7 22 - 2014

Page: 1 of 2

Project No: X9275140002-023

Shipment Method: Courier

Number of Coolers Shipped:

Project Name: BMAC	Analyses (Preservative)						Turn-around Time Requested: Standard
	Gamma Spectro	Alpha Spectro	Isotopic Tracer				
Project Manager: Danny O'Connor							
Sampler: <i>[Signature]</i>							
Sample Number:	Date:	Time:					Laboratory Comments:
BMAC-Discrete-00	5/21/14	1435	X X *				S 1
BMAC-Discrete-1	5/21/14	1259	1 1				S 1
BMAC-Discrete-2	5/21/14	1335	1 1				S 1
BMAC-Discrete-3	5/21/14	1310	1 1				S 1
BMAC-Discrete-4	5/21/14	1325	1 1				S 1
BMAC-Discrete-5	5/21/14	1448	1 1				S 1
BMAC-Discrete-6	5/21/14	1455	1 1				S 1
BMAC-Discrete-7	5/21/14	1501	1 1				S 1
BMAC-Discrete-8	5/21/14	1420	1 1				S 1
BMAC-Discrete-9	5/21/14	1400	1 1				S 1
BMAC-Discrete-10	5/21/14	1355	1 1				S 1
Koch-Soil-1	5/22/14	1054	1 1				S 1
Koch-Soil-2	1 1	1102	1 1				S 1
Koch-Soil-3	1 1	1105	1 1				S 1
Koch-Soil-4	1 1	1109	1 1				S 1
Koch-Soil-5	1 1	1114	1 1				S 1
Koch-Soil-6	1 1	1118	1 1				S 1
Koch-Grass-1	1 1	1123	1 1				S 1
Koch-Grass-2	1 1	1130	1 1				S 1
Koch-Grass-3	1 1	1135	1 1				S 1
Koch-Grass-4	1 1	1141	1 1				S 1
Koch-Grass-5	1 1	1147	1 1				S 1
Koch-Grass-6	1 1	1150	1 1				S 1
Blanchette-Soil-1	▼	1331	▼▼▼				S 1

Matrix: S = Soil M = Sediment W = Water A = Air

Preservatives: 1 = Ice 2 = HCl 3 = H<sub>2</sub>SO<sub>4</sub> 4 = NaOH 5 = HNO<sub>3</sub>

Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date: 5/22/14	Time: 1605
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

## **CHAIN-OF-CUSTODY RECORD**



**TETRA TECH EM INC.**  
8030 Flint Street  
Lenexa, Kansas 66214  
(913) 834-2600

Date: 05-21-2014  
Page: 2 of 2  
Project No: XG025140002.023  
Shipment Method: Courier  
Number of Coolers Shipped:

Project Name: BMAC			Analyses (Preservative)				Matrix Type	No. of Containers	Turn-around Time Requested:
Project Manager: Danny O'Connor	Sampler: 	(Signature)	Grammer Size	2-Liter Polyethylene	Isotopic Uranium	Isotopic Thorium			
Sample Number:	Date:	Time:							Laboratory Comments:
Blanchette - Soil - 2	5/22/14	1340	X	X	X		S	1	
Blanchette - Soil - 3		1345							
Blanchette - Soil - 4		1350							
Blanchette - Soil - 5		1355							
Blanchette - Soil - 6		1400							
Blanchette - Grass - 1		1408							
Blanchette - Grass - 2		1415							
Blanchette - Grass - 3		1425							
Blanchette - Grass - 4		1430							
Blanchette - Grass - 5		1435							
Blanchette - Grass - 6	↓	1445	↓	↓	↓		↓	↓	

Matrix: S = Soil    M = Sediment    W = Water    A = Air .  
 Preservatives: 1 = Ice    2 = HCl    3 =  $\text{H}_2\text{SO}_4$     4 = NaOH    5 =  $\text{HNO}_3$

Relinquished By:  (Signature)	Received By:  (Signature)	Date: 5/22/14	Time: 1655
Relinquished By:  (Signature)	Received By:  (Signature)	Date:	Time:
Relinquished By:  (Signature)	Received By:  (Signature)	Date:	Time:

White = Tetra Tech Yellow = Laboratory Pink = Return to Tetra Tech

## Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-6793-1

Login Number: 6793

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Samples collected on 5/23 have custody seals
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	Samples were rec'd on 5/22 and 5/23 - per client all samples in one job.
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

### Qualifiers

Rad

Qualifier      Qualifier Description

U      Result is less than the sample detection limit.

### Glossary

Abbreviation      These commonly used abbreviations may or may not be present in this report.

D	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

TestAmerica St. Louis

## Method Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica St. Louis

## Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-1	BMAC-DISCRETE-00	Solid	05/21/14 14:35	05/23/14 13:40
160-6793-2	BMAC-DISCRETE-1	Solid	05/21/14 12:59	05/23/14 13:40
160-6793-3	BMAC-DISCRETE-2	Solid	05/21/14 13:35	05/23/14 13:40
160-6793-4	BMAC-DISCRETE-3	Solid	05/21/14 13:10	05/23/14 13:40
160-6793-5	BMAC-DISCRETE-4	Solid	05/21/14 13:25	05/23/14 13:40
160-6793-6	BMAC-DISCRETE-5	Solid	05/21/14 14:48	05/23/14 13:40
160-6793-7	BMAC-DISCRETE-6	Solid	05/21/14 14:55	05/23/14 13:40
160-6793-8	BMAC-DISCRETE-7	Solid	05/21/14 15:01	05/23/14 13:40
160-6793-9	BMAC-DISCRETE-8	Solid	05/21/14 14:20	05/23/14 13:40
160-6793-10	BMAC-DISCRETE-9	Solid	05/21/14 14:00	05/23/14 13:40
160-6793-11	BMAC-DISCRETE-10	Solid	05/21/14 13:55	05/23/14 13:40
160-6793-12	KOCH-SOIL-1	Solid	05/22/14 10:54	05/23/14 13:40
160-6793-13	KOCH-SOIL-2	Solid	05/22/14 11:02	05/23/14 13:40
160-6793-14	KOCH-SOIL-3	Solid	05/22/14 11:05	05/23/14 13:40
160-6793-15	KOCH-SOIL-4	Solid	05/22/14 11:09	05/23/14 13:40
160-6793-16	KOCH-SOIL-5	Solid	05/22/14 11:14	05/23/14 13:40
160-6793-17	KOCH-SOIL-6	Solid	05/22/14 11:18	05/23/14 13:40
160-6793-18	KOCH-GRASS-1	Solid	05/22/14 11:23	05/23/14 13:40
160-6793-19	KOCH-GRASS-2	Solid	05/22/14 11:30	05/23/14 13:40
160-6793-20	KOCH-GRASS-3	Solid	05/22/14 11:35	05/23/14 13:40
160-6793-21	KOCH-GRASS-4	Solid	05/22/14 11:41	05/23/14 13:40
160-6793-22	KOCH-GRASS-5	Solid	05/22/14 11:47	05/23/14 13:40
160-6793-23	KOCH-GRASS-6	Solid	05/22/14 11:50	05/23/14 13:40
160-6793-24	BLANCHETTE-SOIL-1	Solid	05/22/14 13:31	05/23/14 13:40
160-6793-25	BLANCHETTE-SOIL-2	Solid	05/22/14 13:40	05/23/14 13:40
160-6793-26	BLANCHETTE-SOIL-3	Solid	05/22/14 13:45	05/23/14 13:40
160-6793-27	BLANCHETTE-SOIL-4	Solid	05/22/14 13:50	05/23/14 13:40
160-6793-28	BLANCHETTE-SOIL-5	Solid	05/22/14 13:55	05/23/14 13:40
160-6793-29	BLANCHETTE-SOIL-6	Solid	05/22/14 14:00	05/23/14 13:40
160-6793-30	BLANCHETTE-GRASS-1	Solid	05/22/14 14:08	05/23/14 13:40
160-6793-31	BLANCHETTE-GRASS-2	Solid	05/22/14 14:15	05/23/14 13:40
160-6793-32	BLANCHETTE-GRASS-3	Solid	05/22/14 14:25	05/23/14 13:40
160-6793-33	BLANCHETTE-GRASS-4	Solid	05/22/14 14:30	05/23/14 13:40
160-6793-34	BLANCHETTE-GRASS-5	Solid	05/22/14 14:35	05/23/14 13:40
160-6793-35	BLANCHETTE-GRASS-6	Solid	05/22/14 14:45	05/23/14 13:40
160-6793-36	BMAC-GRASS-1	Solid	05/23/14 10:57	05/23/14 13:40
160-6793-37	BMAC-GRASS-2	Solid	05/23/14 10:51	05/23/14 13:40
160-6793-38	BMAC-GRASS-3	Solid	05/23/14 10:47	05/23/14 13:40
160-6793-39	BMAC-GRASS-4	Solid	05/23/14 10:38	05/23/14 13:40
160-6793-40	BMAC-GRASS-5	Solid	05/23/14 11:02	05/23/14 13:40
160-6793-41	BMAC-GRASS-6	Solid	05/23/14 08:58	05/23/14 13:40
160-6793-42	BMAC-GRASS-7	Solid	05/23/14 11:06	05/23/14 13:40
160-6793-43	BMAC-GRASS-8	Solid	05/23/14 09:28	05/23/14 13:40
160-6793-44	BMAC-GRASS-9	Solid	05/23/14 08:44	05/23/14 13:40
160-6793-45	BMAC-GRASS-10	Solid	05/23/14 11:12	05/23/14 13:40
160-6793-46	BMAC-GRASS-11	Solid	05/23/14 10:30	05/23/14 13:40
160-6793-47	BMAC-GRASS-12	Solid	05/23/14 10:00	05/23/14 13:40
160-6793-48	BMAC-GRASS-13	Solid	05/23/14 10:23	05/23/14 13:40
160-6793-49	BMAC-GRASS-14	Solid	05/23/14 07:52	05/23/14 13:40
160-6793-50	BMAC-GRASS-15	Solid	05/23/14 10:20	05/23/14 13:40
160-6793-51	BMAC-GRASS-16	Solid	05/23/14 08:05	05/23/14 13:40
160-6793-52	BMAC-GRASS-17	Solid	05/23/14 10:14	05/23/14 13:40
160-6793-53	BMAC-GRASS-18	Solid	05/23/14 10:35	05/23/14 13:40

TestAmerica St. Louis

## Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-54	BMAC-GRASS-19	Solid	05/23/14 09:47	05/23/14 13:40
160-6793-55	BMAC-GRASS-20	Solid	05/23/14 09:40	05/23/14 13:40
160-6793-56	BMAC-GRASS-21	Solid	05/23/14 10:10	05/23/14 13:40
160-6793-57	BMAC-GRASS-22	Solid	05/23/14 10:45	05/23/14 13:40
160-6793-58	BMAC-GRASS-23	Solid	05/23/14 09:52	05/23/14 13:40
160-6793-59	BMAC-GRASS-24	Solid	05/23/14 08:57	05/23/14 13:40
160-6793-60	BMAC-GRASS-25	Solid	05/23/14 08:45	05/23/14 13:40
160-6793-61	BMAC-GRASS-26	Solid	05/23/14 09:58	05/23/14 13:40
160-6793-62	BMAC-GRASS-27	Solid	05/23/14 10:03	05/23/14 13:40
160-6793-63	BMAC-GRASS-28	Solid	05/23/14 08:05	05/23/14 13:40
160-6793-64	BMAC-GRASS-29	Solid	05/23/14 07:45	05/23/14 13:40
160-6793-65	BMAC-GRASS-30	Solid	05/23/14 07:52	05/23/14 13:40
160-6793-66	BMAC-SOIL-1	Solid	05/23/14 09:07	05/23/14 13:40
160-6793-67	BMAC-SOIL-2	Solid	05/23/14 09:11	05/23/14 13:40
160-6793-68	BMAC-SOIL-3	Solid	05/23/14 09:13	05/23/14 13:40
160-6793-69	BMAC-SOIL-4	Solid	05/23/14 09:35	05/23/14 13:40
160-6793-70	BMAC-SOIL-5	Solid	05/23/14 09:33	05/23/14 13:40
160-6793-71	BMAC-SOIL-6	Solid	05/23/14 09:39	05/23/14 13:40
160-6793-72	BMAC-SOIL-7	Solid	05/23/14 08:41	05/23/14 13:40
160-6793-73	BMAC-SOIL-8	Solid	05/23/14 08:38	05/23/14 13:40
160-6793-74	BMAC-SOIL-9	Solid	05/23/14 07:47	05/23/14 13:40
160-6793-75	BMAC-SOIL-10	Solid	05/23/14 08:26	05/23/14 13:40
160-6793-76	BMAC-SOIL-11	Solid	05/23/14 07:43	05/23/14 13:40
160-6793-77	BMAC-SOIL-12	Solid	05/23/14 08:21	05/23/14 13:40
160-6793-78	BMAC-SOIL-13	Solid	05/23/14 08:29	05/23/14 13:40
160-6793-79	BMAC-SOIL-14	Solid	05/23/14 08:17	05/23/14 13:40
160-6793-80	BMAC-SOIL-15	Solid	05/23/14 10:08	05/23/14 13:40
160-6793-81	BMAC-SOIL-16	Solid	05/23/14 11:05	05/23/14 13:40
160-6793-82	BMAC-SOIL-17	Solid	05/23/14 11:00	05/23/14 13:40
160-6793-83	BMAC-SOIL-18	Solid	05/23/14 11:08	05/23/14 13:40
160-6793-84	BMAC-SOIL-19	Solid	05/23/14 09:34	05/23/14 13:40
160-6793-85	BMAC-SOIL-20	Solid	05/23/14 09:32	05/23/14 13:40
160-6793-86	BMAC-SOIL-21	Solid	05/23/14 09:03	05/23/14 13:40
160-6793-87	BMAC-SOIL-22	Solid	05/23/14 09:12	05/23/14 13:40
160-6793-88	BMAC-SOIL-23	Solid	05/23/14 09:07	05/23/14 13:40
160-6793-89	BMAC-SOIL-24	Solid	05/23/14 09:25	05/23/14 13:40
160-6793-90	BMAC-SOIL-25	Solid	05/23/14 09:18	05/23/14 13:40
160-6793-91	BMAC-SOIL-26	Solid	05/23/14 08:40	05/23/14 13:40
160-6793-92	BMAC-SOIL-27	Solid	05/23/14 08:35	05/23/14 13:40
160-6793-93	BMAC-SOIL-28	Solid	05/23/14 08:32	05/23/14 13:40
160-6793-94	BMAC-SOIL-29	Solid	05/23/14 08:25	05/23/14 13:40
160-6793-95	BMAC-SOIL-30	Solid	05/23/14 08:15	05/23/14 13:40
160-6793-96	BMAC-OUTFALL-2	Solid	05/23/14 12:24	05/23/14 13:40
160-6793-97	BMAC-OUTFALL-3	Solid	05/23/14 12:40	05/23/14 13:40
160-6793-98	BMAC-OUTFALL-4	Solid	05/23/14 12:42	05/23/14 13:40
160-6793-99	BMAC-OUTFALL-5	Solid	05/23/14 13:02	05/23/14 13:40
160-6793-100	BMAC-OUTFALL-6	Solid	05/23/14 12:59	05/23/14 13:40
160-6793-101	BMAC-OUTFALL-7	Solid	05/23/14 12:55	05/23/14 13:40
160-6793-102	BMAC-OUTFALL-8	Solid	05/23/14 12:51	05/23/14 13:40
160-6793-103	BMAC-OUTFALL-9	Solid	05/23/14 12:47	05/23/14 13:40
160-6793-104	BMAC-OUTFALL-10	Solid	05/23/14 12:03	05/23/14 13:40
160-6793-105	BMAC-OUTFALL-11	Solid	05/23/14 12:12	05/23/14 13:40
160-6793-106	BMAC-OUTFALL-14	Solid	05/23/14 11:49	05/23/14 13:40

TestAmerica St. Louis

## Sample Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6793-107	BMAC-OUTFALL-15	Solid	05/23/14 11:44	05/23/14 13:40
160-6793-108	BMAC-OUTFALL-16	Solid	05/23/14 11:40	05/23/14 13:40
160-6793-109	BMAC-OUTFALL-17	Solid	05/23/14 11:29	05/23/14 13:40
160-6793-110	BMAC-OUTFALL-18	Solid	05/23/14 11:33	05/23/14 13:40
160-6793-111	BMAC-OUTFALL-19	Solid	05/23/14 13:09	05/23/14 13:40
160-6793-112	BMAC-OUTFALL-20	Solid	05/23/14 13:11	05/23/14 13:40



TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-DISCRETE-00**

**Lab Sample ID: 160-6793-1**

Matrix: Solid

Date Collected: 05/21/14 14:35

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.05		0.154	0.177	1.00	0.0168	pCi/g	05/27/14 09:22	06/02/14 01:42	1
Thorium-230	0.960		0.147	0.167	1.00	0.0168	pCi/g	05/27/14 09:22	06/02/14 01:42	1
Thorium-232	0.894		0.142	0.160	1.00	0.0309	pCi/g	05/27/14 09:22	06/02/14 01:42	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	77.9		30 - 110					05/27/14 09:22	06/02/14 01:42	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.722		0.191	0.201	1.00	0.0380	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0315 U		0.0446	0.0447	1.00	0.0473	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	0.704		0.189	0.198	1.00	0.0657	pCi/g	05/27/14 09:22	05/30/14 18:30	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	76.4		30 - 110					05/27/14 09:22	05/30/14 18:30	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.855	U	0.821	0.829		1.34	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Actinium 228</b>	<b>1.62</b>		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Bismuth-212	0.643 U		0.969	0.971		1.63	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Bismuth-214</b>	<b>1.08</b>		0.267	0.289		0.242	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Lead-210	0.387 U		2.12	2.12		3.81	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Lead-212</b>	<b>1.08</b>		0.211	0.253		0.209	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Lead-214</b>	<b>1.34</b>		0.219	0.260		0.140	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Potassium-40	19.8		2.77	3.44		1.07	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Protactinium-231	0.589 U		0.683	0.686		3.06	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Radium-226	1.08		0.267	0.289	1.00	0.242	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Radium-228	1.62		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Thorium-232</b>	<b>1.62</b>		0.331	0.370		0.171	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Thorium-234	1.07 U		1.79	1.79		3.08	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Thallium-208</b>	<b>0.348</b>		0.103	0.109		0.0680	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Uranium-235	0.0282 U		0.0713	0.0713		0.729	pCi/g	05/28/14 15:58	06/19/14 02:22	1
Uranium-238	1.07 U		1.79	1.79		3.08	pCi/g	05/28/14 15:58	06/19/14 02:22	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 02:22	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-1**

**Lab Sample ID: 160-6793-2**

Date Collected: 05/21/14 12:59

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.636		0.166	0.175	1.00	0.0913	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-230	1.23		0.226	0.249	1.00	0.0590	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-232	0.646		0.164	0.173	1.00	0.0536	pCi/g	05/27/14 09:22	05/30/14 18:35	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	87.2		30 - 110					05/27/14 09:22	05/30/14 18:35	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.883		0.210	0.223	1.00	0.0568	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0310	U	0.0439	0.0440	1.00	0.0465	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	0.831		0.204	0.215	1.00	0.0566	pCi/g	05/27/14 09:22	05/30/14 18:30	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	77.5		30 - 110					05/27/14 09:22	05/30/14 18:30	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0703	U	0.242	0.242		0.471	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Actinium 228	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-212	1.39		0.669	0.685		0.586	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-214	1.41		0.226	0.269		0.149	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-210	6.55		2.29	2.41		3.10	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-212	0.743		0.145	0.174		0.174	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-214	1.37		0.219	0.262		0.152	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Potassium-40	13.8		1.86	2.34		0.464	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Protactinium-231	0.599	U	0.474	0.478		2.21	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-226	1.41		0.226	0.269	1.00	0.149	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-228	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-232	1.05		0.238	0.261		0.119	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-234	0.600	U	0.733	0.736		2.59	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thallium-208	0.335		0.0857	0.0925		0.0607	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-235	0.180	U	0.276	0.277		0.461	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-238	0.600	U	0.733	0.736		2.59	pCi/g	05/28/14 15:58	06/19/14 02:23	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>(2σ+/-)</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-DISCRETE-2**

**Lab Sample ID: 160-6793-3**

Date Collected: 05/21/14 13:35

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.654		0.175	0.183	1.00	0.105	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-230	1.05		0.215	0.232	1.00	0.0568	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-232	0.683		0.173	0.183	1.00	0.0567	pCi/g	05/27/14 09:22	06/02/14 19:24	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.1		30 - 110					05/27/14 09:22	06/02/14 19:24	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.699		0.195	0.203	1.00	0.0614	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0671		0.0671	0.0674	1.00	0.0503	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.808		0.209	0.219	1.00	0.0404	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	72.3		30 - 110					05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.575	U	0.969	0.972		1.62	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Actinium 228	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-212	-0.00916	U	1.22	1.22		2.33	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-214	1.26		0.303	0.330		0.202	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-210	4.34		2.44	2.49		3.60	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-212	0.980		0.209	0.244		0.206	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-214	1.17		0.263	0.290		0.190	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Potassium-40	11.2		2.80	3.03		1.93	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Protactinium-231	1.03	U	1.72	1.73		3.89	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-226	1.26		0.303	0.330	1.00	0.202	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-228	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-232	0.748		0.309	0.318		0.523	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-234	1.11	U	1.04	1.05		3.54	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thallium-208	0.250		0.127	0.130		0.175	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-235	0.223	U	0.436	0.437		0.741	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-238	1.11	U	1.04	1.05		3.54	pCi/g	05/28/14 15:58	06/19/14 16:46	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-3**

**Lab Sample ID: 160-6793-4**

Date Collected: 05/21/14 13:10

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.836		0.196	0.208	1.00	0.0907	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-230	0.792		0.190	0.201	1.00	0.0759	pCi/g	05/27/14 09:22	05/30/14 18:35	1
Thorium-232	0.707		0.179	0.189	1.00	0.0789	pCi/g	05/27/14 09:22	05/30/14 18:35	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	83.9		30 - 110					05/27/14 09:22	05/30/14 18:35	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.625		0.181	0.188	1.00	0.0734	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0291	U	0.0458	0.0459	1.00	0.0731	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.562		0.171	0.177	1.00	0.0669	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	73.8		30 - 110					05/27/14 09:22	05/30/14 18:28	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.241	U	0.258	0.260		0.418	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Actinium 228	1.31		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-212	0.723	U	0.820	0.824		1.33	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Bismuth-214	1.14		0.244	0.271		0.181	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-210	2.77		1.74	1.77		2.43	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-212	1.11		0.157	0.213		0.155	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Lead-214	1.26		0.183	0.225		0.162	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Potassium-40	19.1		2.46	3.14		0.583	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Protactinium-231	0.172	U	0.273	0.273		2.36	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-226	1.14		0.244	0.271	1.00	0.181	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radium-228	1.31		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-232	1.31		0.287	0.316		0.140	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thorium-234	0.942	U	1.38	1.38		2.37	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Thallium-208	0.374		0.0925	0.100		0.0677	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-235	0.105	U	0.247	0.247		0.404	pCi/g	05/28/14 15:58	06/19/14 16:46	1
Uranium-238	0.942	U	1.38	1.38		2.37	pCi/g	05/28/14 15:58	06/19/14 16:46	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:46	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-4**

**Lab Sample ID: 160-6793-5**

Date Collected: 05/21/14 13:25

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.546		0.161	0.168	1.00	0.0852	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-230	0.899		0.210	0.223	1.00	0.118	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-232	0.528		0.163	0.169	1.00	0.115	pCi/g	05/27/14 09:22	06/02/14 01:38	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	82.7		30 - 110					05/27/14 09:22	06/02/14 01:38	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.561		0.162	0.168	1.00	0.0600	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0287	U	0.0406	0.0407	1.00	0.0431	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.593		0.166	0.174	1.00	0.0655	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	83.1		30 - 110					05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.400	U	0.591	0.593		0.980	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Actinium 228	0.851		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Bismuth-212	0.914	U	0.775	0.781		1.17	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Bismuth-214	0.943		0.216	0.237		0.142	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-210	9.45		2.14	2.41		2.28	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-212	0.660		0.153	0.175		0.162	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Lead-214	0.876		0.178	0.200		0.153	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Potassium-40	14.0		2.17	2.60		0.864	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Protactinium-231	0.279	U	0.762	0.762		2.83	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Radium-226	0.943		0.216	0.237	1.00	0.142	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Radium-228	0.851		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thorium-232	0.851		0.260	0.274		0.150	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thorium-234	0.705	U	0.826	0.829		2.61	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Thallium-208	0.367		0.109	0.115		0.0813	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Uranium-235	0.241	U	0.298	0.299		0.550	pCi/g	05/28/14 15:58	06/19/14 16:47	1
Uranium-238	0.705	U	0.826	0.829		2.61	pCi/g	05/28/14 15:58	06/19/14 16:47	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:47	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-5**

**Lab Sample ID: 160-6793-6**

Date Collected: 05/21/14 14:48

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.475		0.145	0.151	1.00	0.0621	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-230	0.637		0.171	0.179	1.00	0.0940	pCi/g	05/27/14 09:22	06/02/14 01:38	1
Thorium-232	0.487		0.148	0.153	1.00	0.0758	pCi/g	05/27/14 09:22	06/02/14 01:38	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	87.3			30 - 110				05/27/14 09:22	06/02/14 01:38	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.338		0.116	0.120	1.00	0.0559	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0420	U	0.0495	0.0496	1.00	0.0695	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.400		0.126	0.130	1.00	0.0446	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	94.5			30 - 110				05/27/14 09:22	05/30/14 18:28	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0765	U	0.158	0.158		0.924	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Actinium 228	0.751		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Bismuth-212	0.710	U	0.564	0.569		0.851	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Bismuth-214	0.772		0.151	0.171		0.121	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-210	0.988	U	1.16	1.17		1.91	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-212	0.787		0.111	0.150		0.0865	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Lead-214	0.718		0.159	0.176		0.143	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Potassium-40	14.4		1.73	2.27		0.813	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Protactinium-231	0.214	U	0.198	0.199		2.33	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Radium-226	0.772		0.151	0.171	1.00	0.121	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Radium-228	0.751		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thorium-232	0.751		0.251	0.263		0.294	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thorium-234	0.928	U	0.887	0.892		1.43	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Thallium-208	0.265		0.0709	0.0760		0.0496	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Uranium-235	0.298	U	0.226	0.228		0.365	pCi/g	05/28/14 15:58	06/19/14 16:48	1
Uranium-238	0.928	U	0.887	0.892		1.43	pCi/g	05/28/14 15:58	06/19/14 16:48	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Other Detected</i>	None						pCi/g	05/28/14 15:58	06/19/14 16:48	1
<i>Radionuclide</i>										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex



**Client Sample ID: BMAC-DISCRETE-6**

**Lab Sample ID: 160-6793-7**

Matrix: Solid

Date Collected: 05/21/14 14:55



Date Received: 05/23/14 13:40



## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.710		0.188	0.197	1.00	0.0860	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.784		0.196	0.207	1.00	0.0770	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.726		0.188	0.198	1.00	0.0735	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	80.0		30 - 110					05/27/14 09:22	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.457		0.156	0.161	1.00	0.0685	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.000	U	0.00615	0.00615	1.00	0.0492	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.579		0.175	0.181	1.00	0.0395	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	73.1		30 - 110					05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0500	U	0.342	0.342		0.635	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Actinium 228	1.43		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-212	0.893	U	0.716	0.722		1.06	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-214	1.23		0.235	0.268		0.192	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-210	2.13	U	2.08	2.10		3.16	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-212	1.03		0.197	0.238		0.198	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-214	1.15		0.237	0.266		0.239	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Potassium-40	14.6		2.05	2.54		0.800	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Protactinium-231	0.120	U	0.395	0.396		2.60	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-226	1.23		0.235	0.268	1.00	0.192	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-228	1.43		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-232	1.43		0.301	0.334		0.134	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-234	0.737	U	0.841	0.844		2.88	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thallium-208	0.228		0.0855	0.0887		0.115	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-235	0.233	U	0.355	0.356		0.604	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-238	0.737	U	0.841	0.844		2.88	pCi/g	05/28/14 15:58	06/19/14 16:49	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected Radionuclide	None						pCi/g	05/28/14 15:58	06/19/14 16:49	1



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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-7**

**Lab Sample ID: 160-6793-8**

Date Collected: 05/21/14 15:01

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.545		0.163	0.169	1.00	0.130	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.720		0.180	0.190	1.00	0.109	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.479		0.143	0.149	1.00	0.0694	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	92.7			30 - 110				05/27/14 09:22	06/02/14 01:39	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.477		0.145	0.151	1.00	0.0568	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0408		0.0472	0.0473	1.00	0.0408	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.448		0.140	0.145	1.00	0.0328	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	89.0			30 - 110				05/27/14 09:22	05/30/14 18:28	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0709	U	0.160	0.160		1.45	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Actinium 228	0.657		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-212	0.285	U	0.716	0.716		1.25	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Bismuth-214	0.891		0.199	0.219		0.185	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-210	2.32	U	1.82	1.84		2.62	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-212	0.779		0.155	0.185		0.154	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Lead-214	0.823		0.164	0.185		0.148	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Potassium-40	12.9		1.82	2.25		1.03	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Protactinium-231	0.573	U	0.763	0.765		2.17	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-226	0.891		0.199	0.219	1.00	0.185	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Radium-228	0.657		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-232	0.657		0.176	0.189		0.281	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thorium-234	0.171	U	0.359	0.359		2.01	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Thallium-208	0.276		0.0686	0.0743		0.0609	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-235	-0.0257	U	0.0666	0.0666		0.549	pCi/g	05/28/14 15:58	06/19/14 16:49	1
Uranium-238	0.171	U	0.359	0.359		2.01	pCi/g	05/28/14 15:58	06/19/14 16:49	1
<i>Other Detected Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Count</i>	<i>Total</i>						
<i>Other Detected Radionuclide</i>	<i>None</i>		<i>Uncert.</i>	<i>Uncert.</i>						

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-DISCRETE-8**

**Lab Sample ID: 160-6793-9**

Matrix: Solid

Date Collected: 05/21/14 14:20

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.739		0.188	0.198	1.00	0.0860	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.918		0.209	0.222	1.00	0.0793	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.711		0.183	0.192	1.00	0.0686	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.8		30 - 110					05/27/14 09:22	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.480		0.167	0.171	1.00	0.0983	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0936	U	0.0851	0.0854	1.00	0.0979	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.539		0.175	0.181	1.00	0.0893	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	69.9		30 - 110					05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.269		0.153	0.157		0.224	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Actinium 228	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Bismuth-212	0.607	U	0.771	0.774		1.27	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Bismuth-214	1.14		0.222	0.252		0.203	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-210	3.94		2.49	2.54		3.19	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-212	1.07		0.161	0.213		0.172	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Lead-214	1.27		0.223	0.259		0.197	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Potassium-40	15.5		2.06	2.60		1.07	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Protactinium-231	0.138	U	0.264	0.264		2.96	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Radium-226	1.14		0.222	0.252	1.00	0.203	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Radium-228	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Thorium-232	1.10		0.238	0.263		0.188	pCi/g	05/28/14 15:58	06/19/14 16:50	1
Thorium-234	0.980	U	0.832	0.838		2.73	pCi/g	05/28/14 15:58	06/19/14 16:50	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:50	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-DISCRETE-9**

**Lab Sample ID: 160-6793-10**

Date Collected: 05/21/14 14:00

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.753		0.189	0.199	1.00	0.0931	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.887		0.204	0.217	1.00	0.0843	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.523		0.156	0.162	1.00	0.0754	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	81.5			30 - 110				05/27/14 09:22	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.442		0.144	0.149	1.00	0.0901	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0112	U	0.0280	0.0280	1.00	0.0627	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.500		0.152	0.158	1.00	0.0845	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	85.0			30 - 110				05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.0205	U	0.0686	0.0686		0.405	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Actinium-228	0.751		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-212	0.446	U	0.722	0.723		1.22	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-214	0.844		0.226	0.242		0.212	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-210	2.91		1.82	1.85		2.58	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-212	0.659		0.136	0.161		0.161	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-214	0.887		0.180	0.202		0.132	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Potassium-40	14.9		2.19	2.67		1.19	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Protactinium-231	0.954	U	0.807	0.814		2.03	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-226	0.844		0.226	0.242	1.00	0.212	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-228	0.751		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-232	0.751		0.232	0.244		0.133	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-234	0.636	U	0.601	0.605		2.01	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thallium-208	0.312		0.0754	0.0821		0.0545	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-235	0.0954	U	0.193	0.194		0.548	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-238	0.636	U	0.601	0.605		2.01	pCi/g	05/28/14 15:58	06/19/14 16:51	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-DISCRETE-10**

**Lab Sample ID: 160-6793-11**

Matrix: Solid

Date Collected: 05/21/14 13:55

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.944		0.214	0.228	1.00	0.0624	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.792		0.197	0.208	1.00	0.0817	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.891		0.207	0.220	1.00	0.0655	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	77.6		30 - 110					05/27/14 09:22	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.641		0.174	0.182	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-235/236	0.0262	U	0.0412	0.0413	1.00	0.0658	pCi/g	05/27/14 09:22	05/30/14 18:28	1
Uranium-238	0.621		0.170	0.178	1.00	0.0602	pCi/g	05/27/14 09:22	05/30/14 18:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	83.2		30 - 110					05/27/14 09:22	05/30/14 18:28	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0257	U	0.502	0.502		0.865	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Actinium-228	0.589		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-212	0.426	U	0.822	0.823		1.41	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Bismuth-214	1.13		0.225	0.254		0.182	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-210	2.18	U	1.79	1.81		2.36	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-212	0.792		0.142	0.175		0.154	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Lead-214	0.960		0.182	0.208		0.178	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Potassium-40	11.6		1.91	2.25		0.864	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Protactinium-231	0.671	U	1.25	1.25		2.13	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-226	1.13		0.225	0.254	1.00	0.182	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radium-228	0.589		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-232	0.589		0.272	0.279		0.336	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thorium-234	0.920	U	1.32	1.32		2.28	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Thallium-208	0.263		0.0936	0.0975		0.0789	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-235	0.185	U	0.337	0.337		0.577	pCi/g	05/28/14 15:58	06/19/14 16:51	1
Uranium-238	0.920	U	1.32	1.32		2.28	pCi/g	05/28/14 15:58	06/19/14 16:51	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 16:51	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Client Sample ID: KOCH-SOIL-1

Date Collected: 05/22/14 10:54

Date Received: 05/23/14 13:40

## Lab Sample ID: 160-6793-12

Matrix: Solid

### Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.724		0.199	0.208	1.00	0.0940	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.03		0.234	0.249	1.00	0.0688	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.822		0.209	0.220	1.00	0.0749	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	73.2		30 - 110					05/27/14 09:22	06/02/14 01:39	1

### Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.574		0.168	0.175	1.00	0.0909	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0979		0.0786	0.0790	1.00	0.0768	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.555		0.165	0.171	1.00	0.0806	pCi/g	05/27/14 09:22	05/30/14 18:29	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	78.8		30 - 110					05/27/14 09:22	05/30/14 18:29	1

### Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.188	U	0.156	0.158		1.94	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Actinium 228	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Bismuth-212	0.661	U	0.761	0.764		1.23	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Bismuth-214	1.36		0.238	0.277		0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-210	0.724	U	1.82	1.82		3.35	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-212	1.20		0.171	0.231		0.174	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Lead-214	1.49		0.207	0.259		0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Potassium-40	15.8		2.15	2.69		0.851	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Protactinium-231	0.878	U	1.18	1.18		2.37	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Radium-226	1.36		0.238	0.277	1.00	0.166	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Radium-228	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thorium-232	1.30		0.294	0.323		0.202	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thorium-234	0.876	U	0.813	0.818		2.58	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Thallium-208	0.389		0.0997	0.108		0.0751	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Uranium-235	0.242	U	0.320	0.321		0.478	pCi/g	05/28/14 15:58	06/19/14 16:52	1
Uranium-238	0.876	U	0.813	0.818		2.58	pCi/g	05/28/14 15:58	06/19/14 16:52	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide						pCi/g		05/28/14 15:58	06/19/14 16:52	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: KOCH-SOIL-2**

**Lab Sample ID: 160-6793-13**

Date Collected: 05/22/14 11:02

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.851		0.216	0.227	1.00	0.0950	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.22		0.257	0.276	1.00	0.0910	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.800		0.210	0.221	1.00	0.105	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	69.6		30 - 110					05/27/14 09:22	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.515		0.162	0.168	1.00	0.0762	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0466		0.0538	0.0539	1.00	0.0466	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.529		0.164	0.169	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:29	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	75.4		30 - 110					05/27/14 09:22	05/30/14 18:29	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.614	U	0.685	0.690		1.12	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Actinium 228	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Bismuth-212	1.58		0.879	0.894		0.894	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Bismuth-214	1.34		0.268	0.302		0.164	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-210	2.17	U	2.04	2.06		3.31	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-212	1.14		0.166	0.222		0.152	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Lead-214	1.37		0.228	0.269		0.184	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Potassium-40	17.6		2.44	3.03		0.867	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Protactinium-231	0.678	U	1.28	1.29		2.56	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Radium-226	1.34		0.268	0.302	1.00	0.164	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Radium-228	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thorium-232	0.910		0.295	0.309		0.200	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thorium-234	3.48		2.39	2.42		2.84	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Thallium-208	0.448		0.0976	0.108		0.0520	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Uranium-235	0.128	U	0.374	0.375		0.608	pCi/g	05/28/14 15:58	06/19/14 17:41	1
Uranium-238	3.48		2.39	2.42		2.84	pCi/g	05/28/14 15:58	06/19/14 17:41	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 17:41	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: KOCH-SOIL-3**

**Lab Sample ID: 160-6793-14**

Date Collected: 05/22/14 11:05

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.654		0.156	0.166	1.00	0.0818	pCi/g	05/27/14 09:22	06/18/14 16:25	1
Thorium-230	0.904		0.180	0.195	1.00	0.0492	pCi/g	05/27/14 09:22	06/18/14 16:25	1
Thorium-232	0.714		0.160	0.170	1.00	0.0489	pCi/g	05/27/14 09:22	06/18/14 16:25	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	48.9		30 - 110					05/27/14 09:22	06/18/14 16:25	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.614		0.152	0.161	1.00	0.0679	pCi/g	05/27/14 09:22	06/02/14 01:35	1
Uranium-235/236	0.0315	U	0.0487	0.0488	1.00	0.0845	pCi/g	05/27/14 09:22	06/02/14 01:35	1
Uranium-238	0.667		0.157	0.167	1.00	0.0508	pCi/g	05/27/14 09:22	06/02/14 01:35	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	45.9		30 - 110					05/27/14 09:22	06/02/14 01:35	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.434		0.188	0.196		0.220	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Actinium-228	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-212	0.902	U	0.646	0.653		0.964	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-214	0.986		0.201	0.226		0.172	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-210	2.73		1.40	1.43		1.69	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-212	1.07		0.145	0.200		0.147	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-214	1.44		0.195	0.246		0.176	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Potassium-40	15.5		1.80	2.40		0.823	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Protactinium-231	0.479	U	0.826	0.828		2.15	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-226	0.986		0.201	0.226	1.00	0.172	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-228	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-232	1.28		0.197	0.236		0.231	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-234	1.48	U	1.43	1.44		2.33	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thallium-208	0.486		0.101	0.113		0.0674	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-235	0.230	U	0.304	0.305		0.489	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-238	1.48	U	1.43	1.44		2.33	pCi/g	05/28/14 15:58	06/19/14 17:38	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex



**Client Sample ID: KOCH-SOIL-4**

**Lab Sample ID: 160-6793-15**

Matrix: Solid

Date Collected: 05/22/14 11:09

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.919		0.221	0.234	1.00	0.119	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-230	0.850		0.208	0.220	1.00	0.0654	pCi/g	05/27/14 09:22	06/02/14 19:24	1
Thorium-232	0.533		0.165	0.171	1.00	0.0715	pCi/g	05/27/14 09:22	06/02/14 19:24	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	76.0		30 - 110					05/27/14 09:22	06/02/14 19:24	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.442		0.151	0.156	1.00	0.0663	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0477		0.0550	0.0552	1.00	0.0477	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.686		0.187	0.196	1.00	0.0580	pCi/g	05/27/14 09:22	05/30/14 18:29	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	74.6		30 - 110					05/27/14 09:22	05/30/14 18:29	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.000380	U	0.000754	0.000756		0.843	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Actinium 228	1.31		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-212	0.177	U	0.772	0.772		1.38	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-214	1.65		0.256	0.308		0.168	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-210	2.74	U	2.36	2.39		3.32	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-212	1.29		0.192	0.254		0.215	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-214	1.28		0.218	0.255		0.261	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Potassium-40	16.6		2.14	2.73		0.761	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Protactinium-231	-0.227	U	1.68	1.68		2.95	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-226	1.65		0.256	0.308	1.00	0.168	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-228	1.31		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-232	1.31		0.238	0.273		0.190	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-234	1.08	U	1.62	1.62		2.81	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thallium-208	0.405		0.107	0.115		0.0998	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-235	0.415	U	0.346	0.348		0.606	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-238	1.08	U	1.62	1.62		2.81	pCi/g	05/28/14 15:58	06/19/14 17:39	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>						
Other Detected	None				RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/28/14 15:58	06/19/14 17:39	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: KOCH-SOIL-5**

**Lab Sample ID: 160-6793-16**

Date Collected: 05/22/14 11:14

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.617		0.171	0.179	1.00	0.0753	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	1.12		0.229	0.248	1.00	0.0678	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.814		0.195	0.207	1.00	0.0707	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Thorium-229	82.2			30 - 110				05/27/14 09:22	06/02/14 01:39	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.594		0.163	0.170	1.00	0.0669	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0409		0.0472	0.0473	1.00	0.0409	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.582		0.161	0.168	1.00	0.0667	pCi/g	05/27/14 09:22	05/30/14 18:29	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Uranium-232	86.9			30 - 110				05/27/14 09:22	05/30/14 18:29	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.123	U	0.215	0.215		1.72	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Actinium 228	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-212	1.14	U	0.795	0.804		1.18	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Bismuth-214	1.21		0.226	0.259		0.197	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-210	-0.0589	U	2.22	2.22		3.71	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-212	1.22		0.171	0.232		0.177	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Lead-214	1.24		0.189	0.229		0.195	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Potassium-40	15.8		2.04	2.60		1.07	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Protactinium-231	0.775	U	0.518	0.525		2.65	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-226	1.21		0.226	0.259	1.00	0.197	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Radium-228	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-232	0.928		0.230	0.249		0.370	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thorium-234	2.67		0.992	1.03		2.58	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Thallium-208	0.449		0.104	0.114		0.0871	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-235	0.137	U	0.240	0.241		0.601	pCi/g	05/28/14 15:58	06/19/14 17:39	1
Uranium-238	2.67		0.992	1.03		2.58	pCi/g	05/28/14 15:58	06/19/14 17:39	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide						pCi/g		05/28/14 15:58	06/19/14 17:39	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: KOCH-SOIL-6**

Date Collected: 05/22/14 11:18

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-17**

Matrix: Solid

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.576		0.173	0.180	1.00	0.103	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-230	0.824		0.204	0.215	1.00	0.0840	pCi/g	05/27/14 09:22	06/02/14 01:39	1
Thorium-232	0.636		0.177	0.185	1.00	0.0559	pCi/g	05/27/14 09:22	06/02/14 01:39	1
<b>Tracer</b>			<b>%Yield</b>	<b>Qualifier</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229			79.0		30 - 110			05/27/14 09:22	06/02/14 01:39	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.405		0.144	0.147	1.00	0.0709	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-235/236	0.0310	U	0.0439	0.0440	1.00	0.0466	pCi/g	05/27/14 09:22	05/30/14 18:29	1
Uranium-238	0.635		0.178	0.186	1.00	0.0373	pCi/g	05/27/14 09:22	05/30/14 18:29	1
<b>Tracer</b>			<b>%Yield</b>	<b>Qualifier</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232			75.9		30 - 110			05/27/14 09:22	05/30/14 18:29	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0696	U	0.183	0.183		1.38	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Actinium 228	1.30		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Bismuth-212	0.386	U	0.667	0.668		1.13	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Bismuth-214	1.26		0.259	0.291		0.203	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-210	1.04	U	1.93	1.93		3.39	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-212	0.911		0.154	0.194		0.182	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Lead-214	1.17		0.181	0.218		0.201	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Potassium-40	15.3		2.04	2.57		1.56	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Protactinium-231	0.282	U	0.667	0.668		2.75	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Radium-226	1.26		0.259	0.291	1.00	0.203	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Radium-228	1.30		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thorium-232	1.30		0.236	0.271		0.167	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thorium-234	0.692	U	0.621	0.625		2.82	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Thallium-208	0.412		0.104	0.112		0.0911	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Uranium-235	0.173	U	0.299	0.299		0.501	pCi/g	05/28/14 15:58	06/19/14 17:40	1
Uranium-238	0.692	U	0.621	0.625		2.82	pCi/g	05/28/14 15:58	06/19/14 17:40	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 17:40	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: KOCH-GRASS-1**

**Lab Sample ID: 160-6793-18**

Date Collected: 05/22/14 11:23

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.707		0.196	0.205	1.00	0.0936	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	0.906		0.219	0.232	1.00	0.0629	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	0.876		0.215	0.227	1.00	0.0597	pCi/g	05/27/14 09:25	06/02/14 01:39	1
<i>Tracer</i>	% Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	70.1			30 - 110				05/27/14 09:25	06/02/14 01:39	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.698		0.200	0.208	1.00	0.0903	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	0.0141 U		0.0353	0.0353	1.00	0.0790	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	0.610		0.185	0.192	1.00	0.0634	pCi/g	05/27/14 09:25	05/30/14 18:29	1
<i>Tracer</i>	% Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	70.5			30 - 110				05/27/14 09:25	05/30/14 18:29	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.122 U		0.224	0.225		0.587	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Actinium 228	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-212	1.78		1.01	1.03		0.992	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-214	1.19		0.230	0.261		0.169	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-210	2.79		1.82	1.85		2.66	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-212	1.23		0.210	0.263		0.191	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-214	1.46		0.223	0.270		0.175	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Potassium-40	12.8		2.20	2.56		1.64	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Protactinium-231	0.439 U		0.414	0.416		2.77	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-226	1.19		0.230	0.261	1.00	0.169	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-228	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-232	1.04		0.267	0.287		0.213	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-234	1.92 U		1.38	1.40		2.27	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thallium-208	0.378		0.0985	0.106		0.0797	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-235	0.145 U		0.179	0.180		0.649	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-238	1.92 U		1.38	1.40		2.27	pCi/g	05/28/14 15:58	06/19/14 17:37	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/28/14 15:58	06/19/14 17:37	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: KOCH-GRASS-2**

**Lab Sample ID: 160-6793-19**

Matrix: Solid

Date Collected: 05/22/14 11:30

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.751		0.204	0.213	1.00	0.131	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	1.12		0.240	0.257	1.00	0.0684	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	0.865		0.210	0.223	1.00	0.0660	pCi/g	05/27/14 09:25	06/02/14 01:39	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	74.8		30 - 110					05/27/14 09:25	06/02/14 01:39	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.582		0.164	0.171	1.00	0.0597	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	0.0429		0.0495	0.0497	1.00	0.0429	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	0.567		0.162	0.169	1.00	0.0653	pCi/g	05/27/14 09:25	05/30/14 18:29	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	78.0		30 - 110					05/27/14 09:25	05/30/14 18:29	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.131	U	0.264	0.264		2.00	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Actinium 228	1.26		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-212	0.234	U	0.893	0.894		1.61	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Bismuth-214	1.29		0.263	0.296		0.197	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-210	2.14	U	1.87	1.89		2.95	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-212	1.03		0.194	0.235		0.225	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Lead-214	1.29		0.262	0.295		0.260	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Potassium-40	16.0		2.56	3.04		1.12	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Protactinium-231	0.701	U	0.661	0.665		3.87	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-226	1.29		0.263	0.296	1.00	0.197	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radium-228	1.26		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-232	1.26		0.283	0.311		0.179	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thorium-234	0.900	U	0.839	0.844		2.67	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Thallium-208	0.398		0.106	0.113		0.0630	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-235	0.386	U	0.407	0.409		0.612	pCi/g	05/28/14 15:58	06/19/14 17:37	1
Uranium-238	0.900	U	0.839	0.844		2.67	pCi/g	05/28/14 15:58	06/19/14 17:37	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 15:58	06/19/14 17:37	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: KOCH-GRASS-3**

**Lab Sample ID: 160-6793-20**

Date Collected: 05/22/14 11:35

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	1.04		0.229	0.245	1.00	0.0945	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-230	1.16		0.241	0.260	1.00	0.0754	pCi/g	05/27/14 09:25	06/02/14 01:39	1
Thorium-232	0.748		0.192	0.202	1.00	0.0560	pCi/g	05/27/14 09:25	06/02/14 01:39	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	Dil Fac
Thorium-229	80.4			30 - 110				05/27/14 09:25	06/02/14 01:39	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.691		0.183	0.192	1.00	0.0623	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-235/236	0.00653	U	0.0314	0.0314	1.00	0.0849	pCi/g	05/27/14 09:25	05/30/14 18:29	1
Uranium-238	0.664		0.179	0.188	1.00	0.0681	pCi/g	05/27/14 09:25	05/30/14 18:29	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	Dil Fac
Uranium-232	77.6			30 - 110				05/27/14 09:25	05/30/14 18:29	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0992	U	0.468	0.469		1.85	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Actinium 228	0.980		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-212	1.75		0.948	0.965		0.901	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Bismuth-214	1.19		0.212	0.245		0.143	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-210	3.34	U	2.33	2.37		3.39	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-212	1.07		0.184	0.230		0.175	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Lead-214	1.34		0.237	0.275		0.179	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Potassium-40	15.9		2.10	2.66		0.513	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Protactinium-231	0.576	U	0.519	0.523		3.05	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-226	1.19		0.212	0.245	1.00	0.143	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Radium-228	0.980		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-232	0.980		0.260	0.279		0.276	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thorium-234	0.741	U	0.873	0.877		2.74	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Thallium-208	0.348		0.102	0.108		0.0811	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-235	0.148	U	0.366	0.367		0.712	pCi/g	05/28/14 15:58	06/19/14 17:38	1
Uranium-238	0.741	U	0.873	0.877		2.74	pCi/g	05/28/14 15:58	06/19/14 17:38	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>Uncert.</i>						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	05/28/14 15:58	06/19/14 17:38	1
Radionuclide							pCi/g			

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: KOCH-GRASS-4**

**Lab Sample ID: 160-6793-21**

Matrix: Solid

Date Collected: 05/22/14 11:41

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.716		0.174	0.184	1.00	0.0731	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	0.947		0.199	0.214	1.00	0.0655	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	0.678		0.168	0.177	1.00	0.0625	pCi/g	06/03/14 09:05	06/10/14 15:21	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	94.4		30 - 110					06/03/14 09:05	06/10/14 15:21	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.561		0.164	0.170	1.00	0.0755	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0118	U	0.0295	0.0296	1.00	0.0661	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.613		0.170	0.177	1.00	0.0605	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	83.4		30 - 110					05/27/14 11:23	05/30/14 18:21	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0458	U	1.60	1.60		2.73	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Actinium-228	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-212	0.879	U	1.45	1.46		2.47	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-214	1.32		0.361	0.386		0.293	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-210	4.12		2.69	2.74		4.08	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-212	1.23		0.254	0.300		0.229	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-214	1.50		0.332	0.367		0.220	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Potassium-40	17.3		3.50	3.93		1.29	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Protactinium-231	1.49	U	1.72	1.72		3.69	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-226	1.32		0.361	0.386	1.00	0.293	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-228	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-232	0.716	U	0.419	0.426		0.792	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-234	1.71	U	1.22	1.23		4.12	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thallium-208	0.273		0.169	0.171		0.233	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-235	0.424	U	0.468	0.470		0.720	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-238	1.71	U	1.22	1.23		4.12	pCi/g	05/28/14 16:56	06/19/14 18:30	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: KOCH-GRASS-5**

**Lab Sample ID: 160-6793-22**

Date Collected: 05/22/14 11:47

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.733		0.186	0.196	1.00	0.0853	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	1.19		0.236	0.256	1.00	0.0787	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.981		0.213	0.229	1.00	0.0680	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	84.3		30 - 110					06/03/14 09:05	06/10/14 15:20	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.434		0.140	0.145	1.00	0.0584	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	-0.00524	U	0.00742	0.00743	1.00	0.0727	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.523		0.154	0.160	1.00	0.0583	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	85.8		30 - 110					05/27/14 11:23	05/30/14 18:21	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.384		0.183	0.190		0.227	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Actinium 228	1.16		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-212	1.13	U	0.861	0.869		1.30	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Bismuth-214	1.30		0.216	0.255		0.117	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-210	1.53	U	1.66	1.67		2.37	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-212	1.02		0.143	0.194		0.136	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Lead-214	1.49		0.205	0.257		0.112	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Potassium-40	15.9		2.17	2.72		0.546	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Protactinium-231	0.255	U	0.259	0.261		2.63	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-226	1.30		0.216	0.255	1.00	0.117	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radium-228	1.16		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-232	1.16		0.231	0.260		0.131	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thorium-234	0.707	U	0.592	0.597		1.95	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Thallium-208	0.361		0.0948	0.102		0.0673	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-235	0.259	U	0.278	0.279		0.454	pCi/g	05/28/14 16:56	06/19/14 18:30	1
Uranium-238	0.707	U	0.592	0.597		1.95	pCi/g	05/28/14 16:56	06/19/14 18:30	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:30	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: KOCH-GRASS-6**

**Lab Sample ID: 160-6793-23**

Matrix: Solid

Date Collected: 05/22/14 11:50

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.721		0.179	0.189	1.00	0.0877	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.932		0.202	0.217	1.00	0.0794	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.836		0.191	0.203	1.00	0.0710	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	86.2		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.732		0.195	0.204	1.00	0.0860	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0472		0.0545	0.0547	1.00	0.0472	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.745		0.194	0.204	1.00	0.0379	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	77.7		30 - 110					05/27/14 11:23	05/30/14 18:21	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0433	U	0.0861	0.0863		0.635	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Actinium 228	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Bismuth-212	0.809	U	0.739	0.743		1.13	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Bismuth-214	1.13		0.231	0.260		0.133	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-210	2.16	U	1.95	1.97		3.14	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-212	1.04		0.192	0.235		0.183	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Lead-214	1.41		0.207	0.253		0.164	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Potassium-40	19.0		2.56	3.22		0.892	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Protactinium-231	0.613	U	0.594	0.598		3.13	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Radium-226	1.13		0.231	0.260	1.00	0.133	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Radium-228	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thorium-232	0.860		0.310	0.322		0.324	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thorium-234	3.66		1.58	1.62		2.49	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Thallium-208	0.456		0.0951	0.106		0.0365	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Uranium-235	0.311	U	0.384	0.385		0.579	pCi/g	05/28/14 16:56	06/19/14 18:31	1
Uranium-238	3.66		1.58	1.62		2.49	pCi/g	05/28/14 16:56	06/19/14 18:31	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:31	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BLANCHETTE-SOIL-1**

**Lab Sample ID: 160-6793-24**

Date Collected: 05/22/14 13:31

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.729		0.177	0.187	1.00	0.0552	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.636		0.166	0.175	1.00	0.0723	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.672		0.169	0.179	1.00	0.0579	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	87.0		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.522		0.156	0.162	1.00	0.0733	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0282	U	0.0399	0.0399	1.00	0.0423	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.847		0.196	0.208	1.00	0.0339	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	81.3		30 - 110					05/27/14 11:23	05/30/14 18:21	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.409	U	0.440	0.443		0.720	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Actinium 228	1.12		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Bismuth-212	0.505	U	0.611	0.613		0.999	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Bismuth-214	0.935		0.185	0.209		0.150	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-210	0.402	U	1.37	1.37		2.34	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-212	0.908		0.125	0.172		0.114	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Lead-214	0.836		0.172	0.192		0.156	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Potassium-40	13.1		1.65	2.13		0.810	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Protactinium-231	0.0528	U	0.819	0.819		2.12	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Radium-226	0.935		0.185	0.209	1.00	0.150	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Radium-228	1.12		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thorium-232	1.12		0.259	0.284		0.162	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thonium-234	1.35	U	0.894	0.905		1.38	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Thallium-208	0.308		0.0619	0.0696		0.0229	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Uranium-235	0.0534	U	0.271	0.271		0.431	pCi/g	05/28/14 16:56	06/19/14 18:25	1
Uranium-238	1.35	U	0.894	0.905		1.38	pCi/g	05/28/14 16:56	06/19/14 18:25	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:25	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-SOIL-2**

**Lab Sample ID: 160-6793-25**

Date Collected: 05/22/14 13:40

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.759		0.185	0.196	1.00	0.0785	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.769		0.185	0.196	1.00	0.0574	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.692		0.175	0.185	1.00	0.0626	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	87.5		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.632		0.168	0.176	1.00	0.0626	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.0248	U	0.0391	0.0391	1.00	0.0623	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.819		0.190	0.202	1.00	0.0570	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	87.8		30 - 110					05/27/14 11:23	05/30/14 18:21	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0996	U	0.313	0.313		1.58	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	1.15		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.482	U	0.673	0.674		1.12	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	1.09		0.187	0.219		0.134	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	1.06	U	1.82	1.82		2.88	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	0.830		0.188	0.216		0.191	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	1.02		0.198	0.225		0.179	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	16.1		2.02	2.61		0.707	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	0.332	U	0.362	0.364		2.86	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	1.09		0.187	0.219	1.00	0.134	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	1.15		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	1.15		0.252	0.278		0.173	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	0.384	U	0.605	0.607		2.59	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	0.305		0.0801	0.0861		0.0745	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	0.248	U	0.272	0.273		0.411	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	0.384	U	0.605	0.607		2.59	pCi/g	05/28/14 16:56	06/19/14 18:26	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>(2σ+/-)</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected Radionuclide	None					pCi/g		05/28/14 16:56	06/19/14 18:26	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BLANCHETTE-SOIL-3**

**Lab Sample ID: 160-6793-26**

Date Collected: 05/22/14 13:45

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.688		0.175	0.184	1.00	0.0768	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.734		0.180	0.190	1.00	0.0735	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.867		0.196	0.209	1.00	0.0851	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	86.0			30 - 110				06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.464		0.144	0.150	1.00	0.0579	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-235/236	0.00866	U	0.0287	0.0287	1.00	0.0720	pCi/g	05/27/14 11:23	05/30/14 18:21	1
Uranium-238	0.549		0.157	0.164	1.00	0.0632	pCi/g	05/27/14 11:23	05/30/14 18:21	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	88.0			30 - 110				05/27/14 11:23	05/30/14 18:21	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0655	U	0.133	0.133		0.744	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium 228	1.04		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	0.406	U	0.655	0.657		1.11	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	1.01		0.243	0.265		0.209	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	1.47	U	1.61	1.61		2.80	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	0.878		0.134	0.176		0.131	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	1.16		0.173	0.211		0.149	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	14.1		1.87	2.37		1.00	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	0.320	U	0.284	0.287		2.45	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	1.01		0.243	0.265	1.00	0.209	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	1.04		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	1.04		0.243	0.265		0.167	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	1.71	U	1.41	1.43		2.36	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	0.410		0.0846	0.0947		0.0671	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	0.125	U	0.314	0.314		0.508	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	1.71	U	1.41	1.43		2.36	pCi/g	05/28/14 16:56	06/19/14 18:27	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BLANCHETTE-SOIL-4**

**Lab Sample ID: 160-6793-27**

Matrix: Solid

Date Collected: 05/22/14 13:50

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.495		0.151	0.157	1.00	0.0934	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.720		0.178	0.188	1.00	0.0664	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.715		0.179	0.189	1.00	0.0856	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.1		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.780		0.181	0.192	1.00	0.0633	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0387		0.0447	0.0448	1.00	0.0387	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.584		0.156	0.164	1.00	0.0589	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	94.7		30 - 110					05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.121	U	0.235	0.235		0.399	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium 228	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	1.91		0.603	0.634		0.351	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	0.843		0.179	0.200		0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	0.793	U	1.56	1.56		2.52	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	0.616		0.143	0.163		0.190	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	0.676		0.168	0.182		0.211	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	14.9		1.87	2.41		0.786	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	-0.0550	U	1.11	1.11		2.00	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	0.843		0.179	0.200	1.00	0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	0.603		0.276	0.283		0.372	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	0.974	U	1.24	1.25		2.15	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	0.300		0.0775	0.0835		0.0663	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	-0.0302	U	0.306	0.306		0.530	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	0.974	U	1.24	1.25		2.15	pCi/g	05/28/14 16:56	06/19/14 18:27	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BLANCHETTE-SOIL-5**

**Lab Sample ID: 160-6793-28**

Date Collected: 05/22/14 13:55

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.658		0.176	0.184	1.00	0.0811	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-230	0.857		0.199	0.212	1.00	0.0726	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-232	0.752		0.186	0.197	1.00	0.0693	pCi/g	06/03/14 09:05	06/11/14 15:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	85.2		30 - 110					06/03/14 09:05	06/11/14 15:44	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.578		0.108	0.119	1.00	0.0330	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-235/236	0.0187		0.0216	0.0217	1.00	0.0187	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-238	0.641		0.113	0.126	1.00	0.0150	pCi/g	05/27/14 11:23	06/02/14 01:33	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	86.9		30 - 110					05/27/14 11:23	06/02/14 01:33	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.101	U	0.269	0.269		1.52	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.843	U	0.827	0.831		1.31	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	0.794		0.212	0.228		0.194	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	1.81	U	1.85	1.87		2.61	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	0.893		0.138	0.180		0.131	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	0.889		0.180	0.203		0.133	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	12.7		1.97	2.36		1.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	-0.190	U	1.16	1.16		2.08	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	0.794		0.212	0.228	1.00	0.194	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	1.16		0.240	0.268		0.302	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	1.22	U	1.35	1.36		2.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	0.331		0.0957	0.102		0.0804	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	-0.0107	U	0.0277	0.0277		0.504	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	1.22	U	1.35	1.36		2.28	pCi/g	05/28/14 16:56	06/19/14 18:26	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None					pCi/g		05/28/14 16:56	06/19/14 18:26	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-SOIL-6**

**Lab Sample ID: 160-6793-29**

Date Collected: 05/22/14 14:00

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.667		0.178	0.187	1.00	0.0756	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.764		0.190	0.201	1.00	0.0681	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.538		0.160	0.166	1.00	0.0710	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	81.4		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.540		0.152	0.159	1.00	0.0554	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0133	U	0.0265	0.0266	1.00	0.0398	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.520		0.149	0.155	1.00	0.0485	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	86.1		30 - 110					05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.546	U	0.624	0.628		1.02	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Actinium 228	0.635		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-212	0.0173	U	0.825	0.825		1.54	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Bismuth-214	0.804		0.204	0.221		0.176	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-210	2.50	U	1.87	1.89		2.66	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-212	0.753		0.178	0.203		0.189	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Lead-214	0.909		0.167	0.192		0.150	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Potassium-40	14.7		2.33	2.77		1.01	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Protactinium-231	0.500	U	0.388	0.392		2.61	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-226	0.804		0.204	0.221	1.00	0.176	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radium-228	0.635		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-232	0.635		0.247	0.256		0.372	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thorium-234	0.498	U	0.794	0.795		2.44	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Thallium-208	0.255		0.0920	0.0957		0.107	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-235	0.0623	U	0.308	0.308		0.536	pCi/g	05/28/14 16:56	06/19/14 18:26	1
Uranium-238	0.498	U	0.794	0.795		2.44	pCi/g	05/28/14 16:56	06/19/14 18:26	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:26	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-1**

**Lab Sample ID: 160-6793-30**

Date Collected: 05/22/14 14:08

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.810		0.195	0.206	1.00	0.0946	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.823		0.195	0.206	1.00	0.0770	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.706		0.178	0.188	1.00	0.0512	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	86.3			30 - 110				06/03/14 09:05	06/10/14 15:20	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.671		0.201	0.209	1.00	0.0681	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0524	U	0.0649	0.0651	1.00	0.0848	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.896		0.231	0.243	1.00	0.0448	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	64.3			30 - 110				05/27/14 11:23	05/30/14 18:20	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0551	U	0.372	0.373		1.87	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Actinium-228	1.38		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-212	2.05		0.692	0.724		0.431	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Bismuth-214	1.32		0.239	0.276		0.170	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-210	2.69	U	2.19	2.21		3.32	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-212	1.09		0.166	0.217		0.164	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Lead-214	1.17		0.195	0.230		0.186	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Potassium-40	17.1		2.20	2.81		0.519	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Protactinium-231	0.583	U	0.386	0.392		2.85	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-226	1.32		0.239	0.276	1.00	0.170	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radium-228	1.38		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-232	1.38		0.244	0.282		0.133	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thorium-234	1.73	U	1.59	1.60		2.72	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Thallium-208	0.382		0.108	0.115		0.0894	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-235	0.368	U	0.353	0.355		0.586	pCi/g	05/28/14 16:56	06/19/14 18:27	1
Uranium-238	1.73	U	1.59	1.60		2.72	pCi/g	05/28/14 16:56	06/19/14 18:27	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>Uncert.</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 18:27	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-2**

**Lab Sample ID: 160-6793-31**

Date Collected: 05/22/14 14:15

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.536		0.156	0.162	1.00	0.0782	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.968		0.207	0.222	1.00	0.0526	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.688		0.174	0.183	1.00	0.0499	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.6		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.781		0.211	0.221	1.00	0.0901	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0347	U	0.0490	0.0491	1.00	0.0520	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.659		0.193	0.201	1.00	0.0791	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	69.1		30 - 110					05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.818	U	0.939	0.945		1.54	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Actinium 228	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-212	1.10	U	1.28	1.28		2.05	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-214	1.28		0.324	0.351		0.227	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-210	3.34	U	2.42	2.45		3.86	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-212	1.09		0.236	0.275		0.207	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-214	1.14		0.290	0.313		0.280	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Potassium-40	14.1		3.34	3.64		2.28	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Protactinium-231	0.0103	U	2.52	2.52		4.62	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-226	1.28		0.324	0.351	1.00	0.227	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-228	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-232	0.499	U	0.327	0.331		1.16	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-234	3.21	U	2.84	2.85		3.84	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thallium-208	0.439		0.189	0.194		0.181	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-235	0.159	U	0.400	0.401		0.695	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-238	3.21	U	2.84	2.85		3.84	pCi/g	05/28/14 16:56	06/19/14 19:08	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-3**

**Lab Sample ID: 160-6793-32**

Date Collected: 05/22/14 14:25

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.522		0.158	0.164	1.00	0.112	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-230	0.986		0.208	0.224	1.00	0.0620	pCi/g	06/03/14 09:05	06/10/14 15:20	1
Thorium-232	0.387		0.130	0.134	1.00	0.0564	pCi/g	06/03/14 09:05	06/10/14 15:20	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	88.5		30 - 110					06/03/14 09:05	06/10/14 15:20	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.655		0.196	0.203	1.00	0.0820	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.000	U	0.00673	0.00673	1.00	0.0538	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.613		0.189	0.196	1.00	0.0748	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	71.8		30 - 110					05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.101	U	0.228	0.229		0.724	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Actinium-228	1.18		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-212	0.450	U	0.894	0.895		1.55	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Bismuth-214	1.16		0.304	0.326		0.231	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-210	2.65	U	2.18	2.21		2.88	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-212	1.08		0.211	0.253		0.203	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Lead-214	1.14		0.197	0.230		0.137	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Potassium-40	16.4		2.60	3.09		1.06	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Protactinium-231	0.355	U	0.488	0.489		3.81	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-226	1.16		0.304	0.326	1.00	0.231	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radium-228	1.18		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-232	1.18		0.283	0.308		0.183	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thorium-234	1.20	U	0.832	0.841		2.78	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Thallium-208	0.247		0.125	0.128		0.166	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-235	0.166	U	0.349	0.349		0.628	pCi/g	05/28/14 16:56	06/19/14 19:08	1
Uranium-238	1.20	U	0.832	0.841		2.78	pCi/g	05/28/14 16:56	06/19/14 19:08	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 19:08	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-4**

**Lab Sample ID: 160-6793-33**

Matrix: Solid

Date Collected: 05/22/14 14:30

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.607		0.166	0.174	1.00	0.0841	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	0.772		0.185	0.196	1.00	0.0671	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	0.511		0.150	0.156	1.00	0.0498	pCi/g	06/03/14 09:05	06/10/14 15:21	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.7		30 - 110					06/03/14 09:05	06/10/14 15:21	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.703		0.194	0.203	1.00	0.0806	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0164	U	0.0329	0.0329	1.00	0.0493	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.541		0.169	0.175	1.00	0.0395	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	71.8		30 - 110					05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.403	U	0.567	0.569		0.939	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Actinium-228	1.38		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-212	1.09		0.662	0.672		0.909	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-214	1.15		0.195	0.229		0.142	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-210	1.53	U	1.68	1.69		2.75	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-212	1.04		0.155	0.205		0.157	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-214	1.47		0.206	0.257		0.144	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Potassium-40	15.7		1.99	2.56		0.982	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Protactinium-231	0.610	U	1.18	1.18		2.51	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-226	1.15		0.195	0.229	1.00	0.142	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-228	1.38		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-232	1.38		0.248	0.285		0.205	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-234	1.31	U	0.759	0.771		2.34	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thallium-208	0.287		0.0793	0.0847		0.0629	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-235	0.189	U	0.332	0.332		0.556	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-238	1.31	U	0.759	0.771		2.34	pCi/g	05/28/14 16:56	06/19/14 19:04	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-5**

**Lab Sample ID: 160-6793-34**

Matrix: Solid

Date Collected: 05/22/14 14:35

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.651		0.177	0.185	1.00	0.0961	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	0.779		0.191	0.202	1.00	0.0780	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	0.560		0.162	0.168	1.00	0.0739	pCi/g	06/03/14 09:05	06/10/14 15:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>							
Thorium-229	86.4		30 - 110							
								Prepared	Analyzed	Dil Fac
								06/03/14 09:05	06/10/14 15:21	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.635		0.182	0.190	1.00	0.0593	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-235/236	0.0324	U	0.0458	0.0459	1.00	0.0486	pCi/g	05/27/14 11:23	05/30/14 18:20	1
Uranium-238	0.707		0.193	0.202	1.00	0.0739	pCi/g	05/27/14 11:23	05/30/14 18:20	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>							
Uranium-232	75.2		30 - 110							
								Prepared	Analyzed	Dil Fac
								05/27/14 11:23	05/30/14 18:20	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.162	U	0.184	0.185		0.777	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Actinium 228	1.41		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-212	0.896	U	0.867	0.872		1.36	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Bismuth-214	1.14		0.287	0.311		0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-210	0.359	U	2.28	2.28		4.20	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-212	0.905		0.207	0.238		0.219	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Lead-214	1.22		0.212	0.246		0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Potassium-40	16.2		2.28	2.82		0.887	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Protactinium-231	0.0453	U	1.71	1.71		3.06	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-226	1.14		0.287	0.311	1.00	0.251	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Radium-228	1.41		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-232	1.41		0.318	0.349		0.246	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thorium-234	2.24	U	1.61	1.63		2.47	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Thallium-208	0.273		0.0915	0.0958		0.0999	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-235	0.297	U	0.328	0.329		0.547	pCi/g	05/28/14 16:56	06/19/14 19:04	1
Uranium-238	2.24	U	1.61	1.63		2.47	pCi/g	05/28/14 16:56	06/19/14 19:04	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>Uncert.</i>						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/28/14 16:56	06/19/14 19:04	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BLANCHETTE-GRASS-6**

**Lab Sample ID: 160-6793-35**

Date Collected: 05/22/14 14:45

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.738		0.192	0.202	1.00	0.0952	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-230	1.08		0.229	0.247	1.00	0.0736	pCi/g	06/03/14 09:05	06/10/14 15:21	1
Thorium-232	0.644		0.177	0.185	1.00	0.0624	pCi/g	06/03/14 09:05	06/10/14 15:21	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	81.3		30 - 110					06/03/14 09:05	06/10/14 15:21	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.656		0.134	0.145	1.00	0.0444	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-235/236	0.0336		0.0336	0.0337	1.00	0.0252	pCi/g	05/27/14 11:23	06/02/14 01:33	1
Uranium-238	0.512		0.118	0.125	1.00	0.0202	pCi/g	05/27/14 11:23	06/02/14 01:33	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	64.5		30 - 110					05/27/14 11:23	06/02/14 01:33	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0500	U	0.977	0.977		1.65	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Actinium 228	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Bismuth-212	0.623	U	0.926	0.929		1.55	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Bismuth-214	1.04		0.205	0.232		0.173	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-210	3.24	U	2.98	3.01		3.72	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-212	1.00		0.165	0.210		0.175	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Lead-214	1.19		0.200	0.235		0.190	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Potassium-40	14.9		2.13	2.62		1.22	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Protactinium-231	-0.841	U	1.65	1.65		2.80	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Radium-226	1.04		0.205	0.232	1.00	0.173	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Radium-228	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thorium-232	1.15		0.232	0.260		0.212	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thorium-234	0.565	U	0.768	0.770		2.96	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Thallium-208	0.449		0.108	0.117		0.0896	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Uranium-235	0.180	U	0.377	0.378		0.690	pCi/g	05/28/14 16:56	06/19/14 19:05	1
Uranium-238	0.565	U	0.768	0.770		2.96	pCi/g	05/28/14 16:56	06/19/14 19:05	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/28/14 16:56	06/19/14 19:05	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-1**

**Lab Sample ID: 160-6793-36**

Matrix: Solid

Date Collected: 05/23/14 10:57

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.756		0.185	0.196	1.00	0.0637	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.994		0.212	0.227	1.00	0.0582	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.817		0.191	0.203	1.00	0.0508	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	84.7			30 - 110				05/29/14 12:48	06/05/14 20:46	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.657		0.169	0.178	1.00	0.0807	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	0.0107	U	0.0267	0.0267	1.00	0.0597	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	0.652		0.169	0.177	1.00	0.0857	pCi/g	05/29/14 12:48	06/05/14 20:40	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	91.8			30 - 110				05/29/14 12:48	06/05/14 20:40	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.557	U	0.548	0.553		0.891	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Actinium 228	1.18		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Bismuth-212	-0.0296	U	0.722	0.722		1.36	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Bismuth-214	1.16		0.277	0.302		0.240	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-210	1.83	U	1.73	1.74		2.69	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-212	1.25		0.208	0.264		0.187	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Lead-214	1.43		0.213	0.259		0.166	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Potassium-40	19.1		2.63	3.28		1.52	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Protactinium-231	0.810	U	0.620	0.627		3.17	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Radium-226	1.16		0.277	0.302	1.00	0.240	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Radium-228	1.18		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thorium-232	1.18		0.316	0.339		0.156	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thorium-234	1.27	U	1.32	1.33		2.25	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Thallium-208	0.315		0.103	0.109		0.127	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Uranium-235	0.222	U	0.317	0.318		0.624	pCi/g	05/29/14 11:21	06/20/14 13:56	1
Uranium-238	1.27	U	1.32	1.33		2.25	pCi/g	05/29/14 11:21	06/20/14 13:56	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 13:56	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-2**

**Lab Sample ID: 160-6793-37**

Matrix: Solid

Date Collected: 05/23/14 10:51

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.935		0.200	0.215	1.00	0.0873	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.906		0.195	0.209	1.00	0.0475	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.926		0.197	0.212	1.00	0.0633	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	86.8		30 - 110					05/29/14 12:48	06/05/14 20:46	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.682		0.172	0.181	1.00	0.0828	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0236	U	0.0372	0.0372	1.00	0.0593	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.546		0.152	0.159	1.00	0.0638	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	92.9		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.0592	U	1.32	1.32		2.23	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Actinium 228	1.29		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Bismuth-212	0.603	U	0.924	0.926		1.55	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Bismuth-214	0.791		0.250	0.263		0.261	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-210	3.59		2.60	2.63		3.30	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-212	1.30		0.262	0.311		0.251	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Lead-214	1.37		0.266	0.302		0.192	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Potassium-40	18.3		2.68	3.27		1.08	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Protactinium-231	0.424	U	0.316	0.319		3.70	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Radium-226	0.791		0.250	0.263	1.00	0.261	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Radium-228	1.29		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thorium-232	1.29		0.269	0.299		0.173	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thorium-234	1.29	U	1.59	1.60		2.73	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Thallium-208	0.506		0.134	0.144		0.103	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Uranium-235	0.262	U	0.369	0.370		0.613	pCi/g	05/29/14 11:21	06/20/14 13:57	1
Uranium-238	1.29	U	1.59	1.60		2.73	pCi/g	05/29/14 11:21	06/20/14 13:57	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	05/29/14 11:21	06/20/14 13:57	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-3**

**Lab Sample ID: 160-6793-38**

Date Collected: 05/23/14 10:47

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.874		0.200	0.213	1.00	0.101	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.965		0.206	0.222	1.00	0.0667	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.846		0.192	0.205	1.00	0.0495	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	84.5			30 - 110				05/29/14 12:48	06/05/14 20:46	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.502		0.160	0.165	1.00	0.104	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0359	U	0.0519	0.0520	1.00	0.0839	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.684		0.182	0.191	1.00	0.0804	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	78.2			30 - 110				05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.133	U	0.539	0.540		2.85	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Actinium 228	0.788		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-212	0.221	U	1.41	1.41		2.61	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-214	1.18		0.302	0.326		0.217	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-210	2.29	U	2.47	2.48		4.33	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-212	1.45		0.289	0.345		0.269	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-214	1.43		0.321	0.354		0.246	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Potassium-40	19.9		3.66	4.19		1.24	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Protactinium-231	1.49	U	1.73	1.74		3.45	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-226	1.18		0.302	0.326	1.00	0.217	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-228	0.788		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-232	0.788		0.364	0.372		0.681	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-234	1.66	U	2.21	2.22		3.82	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thallium-208	0.637		0.181	0.192		0.150	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-235	0.548	U	0.564	0.567		0.898	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-238	1.66	U	2.21	2.22		3.82	pCi/g	05/29/14 11:21	06/20/14 14:35	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-4**

**Lab Sample ID: 160-6793-39**

Date Collected: 05/23/14 10:38

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.917		0.202	0.216	1.00	0.0775	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	1.11		0.222	0.240	1.00	0.0623	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.794		0.186	0.198	1.00	0.0496	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	88.3		30 - 110					05/29/14 12:48	06/05/14 20:46	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.787		0.181	0.193	1.00	0.0750	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0126	U	0.0253	0.0253	1.00	0.0379	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.639		0.162	0.171	1.00	0.0656	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	91.3		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0188	U	0.963	0.963		1.62	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Actinium 228	1.34		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-212	2.62		1.10	1.14		0.931	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-214	1.13		0.189	0.222		0.0795	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-210	1.18	U	1.69	1.70		2.91	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-212	1.18		0.149	0.214		0.131	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-214	1.07		0.181	0.213		0.108	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Potassium-40	15.8		2.15	2.69		0.538	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Protactinium-231	0.816	U	0.478	0.487		2.62	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-226	1.13		0.189	0.222	1.00	0.0795	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-228	1.34		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-232	1.34		0.352	0.378		0.220	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-234	0.832	U	0.608	0.614		2.02	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thallium-208	0.391		0.0879	0.0968		0.0494	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-235	0.00107	U	0.260	0.260		0.455	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-238	0.832	U	0.608	0.614		2.02	pCi/g	05/29/14 11:21	06/20/14 14:33	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None					pCi/g		05/29/14 11:21	06/20/14 14:33	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-5**

**Lab Sample ID: 160-6793-40**

Date Collected: 05/23/14 11:02

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	1.03		0.206	0.223	1.00	0.0535	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	1.08		0.212	0.231	1.00	0.0629	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.777		0.179	0.190	1.00	0.0467	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.0		30 - 110					05/29/14 12:48	06/05/14 20:46	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.626		0.166	0.174	1.00	0.0698	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0243	U	0.0383	0.0384	1.00	0.0611	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.606		0.163	0.171	1.00	0.0657	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	89.9		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.0808	U	0.179	0.179		1.11	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Actinium 228	1.45		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-212	0.464	U	0.836	0.838		1.43	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Bismuth-214	1.39		0.235	0.276		0.0736	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-210	4.44		2.42	2.48		2.87	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-212	1.30		0.222	0.279		0.196	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Lead-214	1.58		0.224	0.278		0.153	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Potassium-40	16.5		2.46	2.99		0.946	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Protactinium-231	0.554	U	0.669	0.672		3.00	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-226	1.39		0.235	0.276	1.00	0.0736	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Radium-228	1.45		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-232	1.45		0.309	0.343		0.263	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thorium-234	1.36	U	0.883	0.894		2.90	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Thallium-208	0.481		0.131	0.140		0.101	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-235	0.220	U	0.437	0.438		0.713	pCi/g	05/29/14 11:21	06/20/14 14:35	1
Uranium-238	1.36	U	0.883	0.894		2.90	pCi/g	05/29/14 11:21	06/20/14 14:35	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 11:21	06/20/14 14:35	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-6**

**Lab Sample ID: 160-6793-41**

Date Collected: 05/23/14 08:58

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.454		0.151	0.155	1.00	0.0908	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.686		0.183	0.191	1.00	0.0807	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.485		0.152	0.157	1.00	0.0613	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	82.8		30 - 110					05/29/14 12:48	06/05/14 20:46	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.384		0.134	0.137	1.00	0.0729	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0508	U	0.0565	0.0567	1.00	0.0728	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.529		0.156	0.162	1.00	0.0727	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	82.9		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.202	U	0.295	0.296		0.489	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Actinium 228	0.254		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Bismuth-212	0.000	U	0.517	0.517		0.650	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Bismuth-214	0.665		0.122	0.140		0.0958	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-210	0.944	U	0.963	0.970		1.57	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-212	0.551		0.0877	0.113		0.0921	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Lead-214	0.523		0.101	0.115		0.111	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Potassium-40	16.2		1.54	2.26		0.577	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Protactinium-231	0.190	U	0.241	0.242		1.42	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Radium-226	0.665		0.122	0.140	1.00	0.0958	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Radium-228	0.254		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thorium-232	0.254		0.143	0.145		0.199	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thorium-234	0.853	U	0.868	0.873		1.41	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Thallium-208	0.211		0.0503	0.0549		0.0370	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Uranium-235	0.0651	U	0.154	0.154		0.352	pCi/g	05/29/14 11:21	06/20/14 14:43	1
Uranium-238	0.853	U	0.868	0.873		1.41	pCi/g	05/29/14 11:21	06/20/14 14:43	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected Radionuclide	None						pCi/g	05/29/14 11:21	06/20/14 14:43	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-7**

**Lab Sample ID: 160-6793-42**

Date Collected: 05/23/14 11:06

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.02		0.210	0.227	1.00	0.0752	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	1.08		0.214	0.232	1.00	0.0550	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	1.01		0.207	0.223	1.00	0.0577	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.4		30 - 110					05/29/14 12:48	06/05/14 20:46	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.840		0.194	0.206	1.00	0.0779	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0682		0.0610	0.0612	1.00	0.0409	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.778		0.187	0.198	1.00	0.0865	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	88.2		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.531	U	0.600	0.604		0.985	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Actinium-228	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Bismuth-212	0.846	U	0.759	0.764		1.18	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Bismuth-214	1.14		0.218	0.249		0.179	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-210	1.78	U	2.09	2.10		3.21	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-212	1.07		0.183	0.230		0.218	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Lead-214	1.15		0.215	0.246		0.236	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Potassium-40	17.8		2.21	2.86		0.761	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Protactinium-231	0.451	U	0.824	0.826		2.83	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Radium-226	1.14		0.218	0.249	1.00	0.179	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Radium-228	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thorium-232	0.711		0.217	0.229		0.379	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thonium-234	1.76	U	1.47	1.48		2.50	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Thallium-208	0.410		0.109	0.117		0.101	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Uranium-235	-0.0231	U	0.572	0.572		0.605	pCi/g	05/29/14 11:21	06/20/14 14:44	1
Uranium-238	1.76	U	1.47	1.48		2.50	pCi/g	05/29/14 11:21	06/20/14 14:44	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 14:44	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-8**

**Lab Sample ID: 160-6793-43**

Date Collected: 05/23/14 09:28

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.544		0.156	0.162	1.00	0.0797	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.566		0.157	0.164	1.00	0.0614	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.533		0.152	0.158	1.00	0.0558	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	86.6		30 - 110					05/29/14 12:48	06/05/14 20:46	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.401		0.136	0.140	1.00	0.0643	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.00616	U	0.0296	0.0296	1.00	0.0801	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.409		0.138	0.142	1.00	0.0689	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	85.0		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.216	U	0.344	0.345		0.573	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Actinium 228	0.769		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Bismuth-212	1.03		0.526	0.537		0.521	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Bismuth-214	0.625		0.170	0.182		0.165	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-210	1.36	U	1.60	1.61		2.26	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-212	0.538		0.103	0.124		0.119	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Lead-214	0.640		0.130	0.146		0.138	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Potassium-40	15.8		1.73	2.36		0.525	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Protactinium-231	0.494	U	0.627	0.629		1.56	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Radium-226	0.625		0.170	0.182	1.00	0.165	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Radium-228	0.769		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thorium-232	0.769		0.201	0.216		0.193	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thorium-234	1.13	U	1.12	1.13		1.59	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Thallium-208	0.203		0.0672	0.0705		0.0638	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Uranium-235	0.114	U	0.140	0.141		0.385	pCi/g	05/29/14 11:21	06/20/14 15:29	1
Uranium-238	1.13	U	1.12	1.13		1.59	pCi/g	05/29/14 11:21	06/20/14 15:29	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>						
Other Detected	None									
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-9**

**Lab Sample ID: 160-6793-44**

Date Collected: 05/23/14 08:44

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.501		0.154	0.159	1.00	0.0972	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.766		0.185	0.196	1.00	0.0628	pCi/g	05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.468		0.144	0.149	1.00	0.0571	pCi/g	05/29/14 12:48	06/05/14 20:46	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	81.4		30 - 110					05/29/14 12:48	06/05/14 20:46	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.577		0.196	0.202	1.00	0.0926	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0127	U	0.0419	0.0419	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.472		0.178	0.183	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	58.3		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.295	U	0.362	0.364		0.596	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Actinium-228	0.533		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Bismuth-212	0.0415	U	0.401	0.401		0.740	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Bismuth-214	0.458		0.108	0.118		0.105	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-210	0.0377	U	1.29	1.29		2.35	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-212	0.493		0.0977	0.117		0.120	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Lead-214	0.576		0.137	0.149		0.139	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Potassium-40	16.9		1.67	2.40		0.560	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Protactinium-231	0.306	U	0.265	0.267		1.91	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Radium-226	0.458		0.108	0.118	1.00	0.105	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Radium-228	0.533		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thorium-232	0.533		0.200	0.207		0.166	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thorium-234	0.0240	U	0.162	0.163		2.14	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Thallium-208	0.178		0.0643	0.0669		0.0644	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Uranium-235	0.0729	U	0.208	0.208		0.355	pCi/g	05/29/14 11:21	06/20/14 14:46	1
Uranium-238	0.0240	U	0.162	0.163		2.14	pCi/g	05/29/14 11:21	06/20/14 14:46	1
<i>Other Detected Radionuclides</i>	Result	Qualifier	Count (2σ+/-)	Total (2σ+/-)	RL	MDC	Unit pCi/g	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None							05/29/14 11:21	06/20/14 14:46	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-10**

**Lab Sample ID: 160-6793-45**

Date Collected: 05/23/14 11:12

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.24		0.235	0.257	1.00	0.0893	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	1.18		0.229	0.250	1.00	0.0746	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.843		0.193	0.206	1.00	0.0666	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	87.8		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.844		0.202	0.214	1.00	0.0810	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0713		0.0665	0.0667	1.00	0.0674	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.898		0.207	0.221	1.00	0.0617	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	82.2		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0818	U	0.470	0.470		1.96	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Actinium 228	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-212	0.946	U	0.934	0.939		1.48	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Bismuth-214	1.35		0.257	0.293		0.193	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-210	3.44		2.12	2.16		3.01	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-212	1.25		0.190	0.250		0.196	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Lead-214	1.44		0.229	0.274		0.211	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Potassium-40	17.6		2.59	3.15		1.72	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Protactinium-231	0.871	U	0.576	0.584		2.92	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-226	1.35		0.257	0.293	1.00	0.193	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radium-228	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-232	0.904		0.337	0.349		0.434	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thorium-234	1.76	U	1.36	1.37		2.24	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Thallium-208	0.308		0.100	0.105		0.121	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-235	0.145	U	0.281	0.282		0.404	pCi/g	05/29/14 11:21	06/20/14 14:33	1
Uranium-238	1.76	U	1.36	1.37		2.24	pCi/g	05/29/14 11:21	06/20/14 14:33	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 14:33	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-11**

**Lab Sample ID: 160-6793-46**

Date Collected: 05/23/14 10:30

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.940		0.203	0.218	1.00	0.0669	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.918		0.200	0.214	1.00	0.0727	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.848		0.192	0.205	1.00	0.0756	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	87.4		30 - 110					05/29/14 12:48	06/05/14 20:47	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.673		0.175	0.184	1.00	0.0644	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0229	U	0.0405	0.0406	1.00	0.0732	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.682		0.177	0.186	1.00	0.0642	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	81.6		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.0442	U	0.0741	0.0743		1.03	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Actinium-228	0.984		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Bismuth-212	1.07	U	1.38	1.38		2.26	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Bismuth-214	0.950		0.250	0.269		0.191	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-210	0.843	U	2.31	2.31		3.83	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-212	0.988		0.242	0.274		0.252	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Lead-214	1.21		0.276	0.304		0.271	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Potassium-40	16.5		3.21	3.63		1.56	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Protactinium-231	0.737	U	0.754	0.759		4.54	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Radium-226	0.950		0.250	0.269	1.00	0.191	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Radium-228	0.984		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thorium-232	0.984		0.397	0.410		0.617	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thorium-234	0.908	U	0.988	0.993		3.33	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Thallium-208	0.464		0.132	0.140		0.101	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Uranium-235	0.133	U	0.346	0.347		0.514	pCi/g	05/29/14 11:21	06/20/14 15:11	1
Uranium-238	0.908	U	0.988	0.993		3.33	pCi/g	05/29/14 11:21	06/20/14 15:11	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:11	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-12**

**Lab Sample ID: 160-6793-47**

Date Collected: 05/23/14 10:00

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.786		0.198	0.209	1.00	0.113	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.999		0.218	0.233	1.00	0.0613	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.689		0.181	0.190	1.00	0.0610	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	82.9		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.577		0.174	0.181	1.00	0.0829	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0129	U	0.0324	0.0324	1.00	0.0725	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.540		0.168	0.174	1.00	0.0780	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	75.4		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.106	U	0.235	0.235		0.422	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Actinium 228	1.02		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Bismuth-212	1.06		0.674	0.683		0.961	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Bismuth-214	0.883		0.187	0.209		0.149	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-210	1.30	U	1.41	1.42		2.39	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-212	0.914		0.124	0.171		0.115	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Lead-214	0.937		0.147	0.176		0.111	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Potassium-40	17.0		2.17	2.78		0.818	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Protactinium-231	0.394	U	0.299	0.302		2.12	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Radium-226	0.883		0.187	0.209	1.00	0.149	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Radium-228	1.02		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thorium-232	1.02		0.194	0.221		0.110	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thorium-234	0.974	U	0.497	0.507		1.50	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Thallium-208	0.341		0.0787	0.0863		0.0518	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Uranium-235	0.170	U	0.221	0.222		0.392	pCi/g	05/29/14 11:21	06/20/14 15:10	1
Uranium-238	0.974	U	0.497	0.507		1.50	pCi/g	05/29/14 11:21	06/20/14 15:10	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:10	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-13**

**Lab Sample ID: 160-6793-48**

Date Collected: 05/23/14 10:23

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.783		0.192	0.203	1.00	0.0931	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.883		0.201	0.214	1.00	0.0591	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.702		0.178	0.188	1.00	0.0339	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	85.3		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.612		0.168	0.176	1.00	0.0651	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	-0.00267	U	0.00534	0.00535	1.00	0.0648	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.672		0.176	0.184	1.00	0.0520	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	86.0		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.379		0.339	0.343		0.330	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Actinium-228	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Bismuth-212	1.38		0.854	0.866		0.889	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Bismuth-214	0.929		0.204	0.225		0.114	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-210	2.34	U	1.97	1.99		3.17	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-212	1.04		0.162	0.211		0.159	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Lead-214	1.30		0.220	0.258		0.191	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Potassium-40	17.8		2.41	3.02		0.843	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Protactinium-231	0.267	U	0.269	0.270		2.78	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Radium-226	0.929		0.204	0.225	1.00	0.114	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Radium-228	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thorium-232	0.640		0.239	0.247		0.360	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thorium-234	1.79	U	1.33	1.34		2.25	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Thallium-208	0.367		0.101	0.108		0.0731	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Uranium-235	0.146	U	0.249	0.249		0.524	pCi/g	05/29/14 11:21	06/20/14 15:09	1
Uranium-238	1.79	U	1.33	1.34		2.25	pCi/g	05/29/14 11:21	06/20/14 15:09	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:09	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-14**

**Lab Sample ID: 160-6793-49**

Date Collected: 05/23/14 07:52

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.599		0.169	0.176	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.676		0.174	0.183	1.00	0.0577	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.637		0.169	0.177	1.00	0.0630	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	85.9		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.407		0.141	0.145	1.00	0.0834	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0383	U	0.0512	0.0513	1.00	0.0758	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.466		0.148	0.153	1.00	0.0533	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	84.1		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.433	U	0.405	0.409		0.661	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Actinium-228	0.749		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-212	0.499	U	0.558	0.560		0.907	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-214	0.467		0.113	0.123		0.100	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-210	0.938	U	0.903	0.909		1.46	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-212	0.495		0.118	0.134		0.120	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-214	0.767		0.134	0.156		0.124	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Potassium-40	16.3		1.56	2.28		0.591	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Protactinium-231	0.355	U	0.488	0.490		1.44	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-226	0.467		0.113	0.123	1.00	0.100	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-228	0.749		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-232	0.749		0.177	0.193		0.118	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-234	0.739	U	0.470	0.477		1.52	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thallium-208	0.221		0.0590	0.0633		0.0475	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-235	0.141	U	0.220	0.221		0.367	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-238	0.739	U	0.470	0.477		1.52	pCi/g	05/29/14 11:21	06/20/14 15:28	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-15**

**Lab Sample ID: 160-6793-50**

Date Collected: 05/23/14 10:20

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.09		0.213	0.231	1.00	0.0755	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.806		0.182	0.194	1.00	0.0466	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.812		0.182	0.194	1.00	0.0463	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	95.3		30 - 110					05/29/14 12:48	06/05/14 20:47	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.652		0.177	0.185	1.00	0.0832	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0355	U	0.0513	0.0514	1.00	0.0828	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.580		0.165	0.172	1.00	0.0607	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	83.7		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.165	U	0.309	0.310		1.90	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Actinium-228	0.907		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-212	0.540	U	0.666	0.668		1.09	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-214	1.20		0.274	0.300		0.243	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-210	0.604	U	1.95	1.95		3.58	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-212	1.06		0.173	0.221		0.190	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-214	1.16		0.199	0.233		0.235	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Potassium-40	17.2		2.21	2.83		0.786	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Protactinium-231	0.993	U	0.666	0.675		3.20	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-226	1.20		0.274	0.300	1.00	0.243	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-228	0.907		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-232	0.907		0.273	0.288		0.429	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-234	1.70	U	1.06	1.08		2.80	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thallium-208	0.394		0.103	0.111		0.0938	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-235	0.00159	U	0.00589	0.00590		0.575	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-238	1.70	U	1.06	1.08		2.80	pCi/g	05/29/14 11:21	06/20/14 16:05	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None					pCi/g		05/29/14 11:21	06/20/14 16:05	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-16**

**Lab Sample ID: 160-6793-51**

Date Collected: 05/23/14 08:05

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.509		0.148	0.154	1.00	0.0913	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.441		0.135	0.140	1.00	0.0579	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.380		0.125	0.129	1.00	0.0525	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	91.3		30 - 110					05/29/14 12:48	06/05/14 20:47	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.422		0.147	0.152	1.00	0.0718	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0285	U	0.0448	0.0449	1.00	0.0715	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.323		0.129	0.131	1.00	0.0654	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	78.0		30 - 110					05/29/14 12:48	06/05/14 20:41	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.114	U	0.152	0.153		0.251	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Actinium 228	0.318		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-212	0.393	U	0.509	0.510		0.839	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Bismuth-214	0.606		0.133	0.148		0.117	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-210	1.68		1.24	1.26		1.67	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-212	0.451		0.0835	0.102		0.0947	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Lead-214	0.502		0.117	0.128		0.109	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Potassium-40	15.0		1.54	2.17		0.648	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Protactinium-231	0.389	U	0.515	0.517		1.63	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-226	0.606		0.133	0.148	1.00	0.117	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Radium-228	0.318		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-232	0.318		0.164	0.167		0.223	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thorium-234	1.08	U	1.15	1.16		1.50	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Thallium-208	0.152		0.0564	0.0586		0.0608	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-235	0.219	U	0.198	0.199		0.304	pCi/g	05/29/14 11:21	06/20/14 16:05	1
Uranium-238	1.08	U	1.15	1.16		1.50	pCi/g	05/29/14 11:21	06/20/14 16:05	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
None							pCi/g	05/29/14 11:21	06/20/14 16:05	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-17**

**Lab Sample ID: 160-6793-52**

Date Collected: 05/23/14 10:14

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.711		0.191	0.200	1.00	0.100	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.831		0.203	0.214	1.00	0.0636	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.435		0.147	0.151	1.00	0.0635	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	78.3			30 - 110				05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.506		0.162	0.168	1.00	0.0729	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0259 U		0.0459	0.0460	1.00	0.0829	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.457		0.156	0.161	1.00	0.0910	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	75.5			30 - 110				05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0707 U		0.0941	0.0945		1.00	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Actinium 228	0.708		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Bismuth-212	0.599 U		0.538	0.542		0.843	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Bismuth-214	0.580		0.151	0.163		0.145	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-210	-0.156 U		1.57	1.57		2.27	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-212	0.656		0.116	0.144		0.107	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Lead-214	0.572		0.129	0.142		0.156	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Potassium-40	14.2		1.56	2.13		0.575	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Protactinium-231	0.414 U		0.301	0.304		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Radium-226	0.580		0.151	0.163	1.00	0.145	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Radium-228	0.708		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thorium-232	0.708		0.184	0.197		0.184	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thorium-234	0.531 U		0.533	0.536		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Thallium-208	0.181		0.0643	0.0670		0.0671	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Uranium-235	0.151 U		0.229	0.230		0.377	pCi/g	05/29/14 11:21	06/20/14 15:30	1
Uranium-238	0.531 U		0.533	0.536		1.99	pCi/g	05/29/14 11:21	06/20/14 15:30	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:30	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-18**

**Lab Sample ID: 160-6793-53**

Date Collected: 05/23/14 10:35

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.636		0.160	0.169	1.00	0.0303	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.752		0.175	0.186	1.00	0.0575	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.640		0.161	0.170	1.00	0.0522	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	97.2		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.593		0.161	0.168	1.00	0.0656	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	0.0668		0.0598	0.0600	1.00	0.0401	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.453		0.141	0.146	1.00	0.0654	pCi/g	05/29/14 12:48	06/05/14 20:41	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	88.6		30 - 110					05/29/14 12:48	06/05/14 20:41	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.00315	U	0.258	0.258		0.461	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Actinium-228	0.867		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-212	0.510	U	0.712	0.714		1.18	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-214	0.954		0.211	0.233		0.161	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-210	1.61	U	1.84	1.85		2.68	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-212	0.960		0.139	0.186		0.129	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-214	0.987		0.165	0.195		0.149	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Potassium-40	16.6		2.12	2.72		0.857	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Protactinium-231	0.547	U	0.687	0.689		2.03	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-226	0.954		0.211	0.233	1.00	0.161	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-228	0.867		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-232	0.867		0.246	0.261		0.348	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-234	0.203	U	0.574	0.575		2.26	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thallium-208	0.277		0.0832	0.0880		0.0814	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-235	0.160	U	0.277	0.277		0.475	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-238	0.203	U	0.574	0.575		2.26	pCi/g	05/29/14 11:21	06/20/14 15:08	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-19**

**Lab Sample ID: 160-6793-54**

Date Collected: 05/23/14 09:47

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.751		0.183	0.194	1.00	0.0777	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.959		0.205	0.221	1.00	0.0568	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.889		0.197	0.211	1.00	0.0566	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.0		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.552		0.173	0.179	1.00	0.121	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	-0.0155	U	0.0495	0.0495	1.00	0.142	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	0.674		0.188	0.196	1.00	0.109	pCi/g	05/29/14 12:48	06/05/14 20:40	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	76.7		30 - 110					05/29/14 12:48	06/05/14 20:40	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0224	U	0.208	0.208		0.868	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Actinium-228	1.08		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-212	0.445	U	0.882	0.884		1.52	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Bismuth-214	1.18		0.230	0.260		0.163	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-210	2.18	U	2.21	2.22		2.98	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-212	0.905		0.254	0.279		0.251	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Lead-214	1.25		0.235	0.269		0.194	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Potassium-40	16.9		2.44	2.99		0.970	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Protactinium-231	0.704	U	0.423	0.430		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-226	1.18		0.230	0.260	1.00	0.163	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radium-228	1.08		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-232	1.08		0.301	0.321		0.155	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thorium-234	0.846	U	1.75	1.75		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Thallium-208	0.472		0.0969	0.109		0.0367	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-235	0.206	U	0.400	0.400		0.632	pCi/g	05/29/14 11:21	06/20/14 15:08	1
Uranium-238	0.846	U	1.75	1.75		3.01	pCi/g	05/29/14 11:21	06/20/14 15:08	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 15:08	1
Radioisotope										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-20**

Date Collected: 05/23/14 09:40

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-55**

Matrix: Solid

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.901		0.200	0.213	1.00	0.0977	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-230	0.945		0.202	0.217	1.00	0.0687	pCi/g	05/29/14 12:48	06/05/14 20:47	1
Thorium-232	0.901		0.195	0.209	1.00	0.0481	pCi/g	05/29/14 12:48	06/05/14 20:47	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.3		30 - 110					05/29/14 12:48	06/05/14 20:47	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.630		0.177	0.185	1.00	0.116	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-235/236	0.0356	U	0.0589	0.0590	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:40	1
Uranium-238	0.845		0.201	0.213	1.00	0.105	pCi/g	05/29/14 12:48	06/05/14 20:40	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	83.8		30 - 110					05/29/14 12:48	06/05/14 20:40	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.120	U	0.186	0.186		1.08	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Actinium 228	0.828		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Bismuth-212	1.14		0.688	0.698		0.977	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Bismuth-214	1.08		0.225	0.251		0.176	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-210	2.63		1.82	1.85		2.22	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-212	1.14		0.143	0.205		0.122	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Lead-214	1.24		0.197	0.235		0.155	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Potassium-40	16.6		1.92	2.57		0.874	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Protactinium-231	0.828	U	0.975	0.979		1.59	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Radium-226	1.08		0.225	0.251	1.00	0.176	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Radium-228	0.828		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thorium-232	0.828		0.203	0.220		0.283	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thorium-234	1.03	U	0.695	0.703		2.43	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Thallium-208	0.453		0.109	0.118		0.0736	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Uranium-235	0.118	U	0.156	0.156		0.599	pCi/g	05/29/14 11:21	06/20/14 16:04	1
Uranium-238	1.03	U	0.695	0.703		2.43	pCi/g	05/29/14 11:21	06/20/14 16:04	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 11:21	06/20/14 16:04	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-21**

**Lab Sample ID: 160-6793-56**

Date Collected: 05/23/14 10:10

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.531		0.170	0.176	1.00	0.119	pCi/g	05/29/14 12:52	06/10/14 15:22	1
Thorium-230	0.963		0.220	0.235	1.00	0.0761	pCi/g	05/29/14 12:52	06/10/14 15:22	1
Thorium-232	0.432		0.147	0.151	1.00	0.0565	pCi/g	05/29/14 12:52	06/10/14 15:22	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	79.2		30 - 110					05/29/14 12:52	06/10/14 15:22	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.440		0.145	0.150	1.00	0.0544	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0297	U	0.0421	0.0421	1.00	0.0446	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.286		0.117	0.119	1.00	0.0358	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	81.6		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0318	U	0.0503	0.0505		0.464	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Actinium-228	0.618		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-212	0.148	U	0.531	0.531		0.945	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-214	0.551		0.117	0.131		0.0636	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-210	1.06	U	1.05	1.06		1.70	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-212	0.454		0.122	0.135		0.124	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-214	0.570		0.107	0.123		0.0584	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Potassium-40	16.3		1.84	2.48		0.536	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Protactinium-231	0.320	U	0.416	0.417		1.81	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-226	0.551		0.117	0.131	1.00	0.0636	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-228	0.618		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-232	0.618		0.209	0.219		0.152	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-234	0.640	U	0.914	0.916		1.60	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thallium-208	0.205		0.0581	0.0619		0.0430	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-235	0.0411	U	0.0848	0.0849		0.408	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-238	0.640	U	0.914	0.916		1.60	pCi/g	05/29/14 13:01	06/20/14 15:43	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-22**

**Lab Sample ID: 160-6793-57**

Matrix: Solid

Date Collected: 05/23/14 10:45

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.798		0.186	0.198	1.00	0.0656	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.03		0.212	0.229	1.00	0.0731	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.862		0.193	0.206	1.00	0.0556	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	88.4		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.743		0.184	0.194	1.00	0.0586	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0845		0.0690	0.0694	1.00	0.0423	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.615		0.168	0.176	1.00	0.0643	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	85.0		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.113	U	0.144	0.145		0.664	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Actinium 228	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-212	1.05	U	0.891	0.897		1.36	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-214	1.04		0.228	0.252		0.188	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-210	3.05		1.86	1.89		2.65	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-212	1.13		0.177	0.229		0.182	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-214	1.12		0.200	0.231		0.161	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Potassium-40	15.0		2.28	2.75		1.08	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Protactinium-231	0.704	U	1.10	1.11		2.49	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-226	1.04		0.228	0.252	1.00	0.188	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-228	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-232	1.52		0.353	0.385		0.253	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-234	0.810	U	0.714	0.719		2.63	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thallium-208	0.477		0.109	0.120		0.0813	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-235	0.259	U	0.371	0.372		0.612	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-238	0.810	U	0.714	0.719		2.63	pCi/g	05/29/14 13:01	06/20/14 15:39	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-23**

**Lab Sample ID: 160-6793-58**

Date Collected: 05/23/14 09:52

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.714		0.181	0.191	1.00	0.0881	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.884		0.199	0.213	1.00	0.0634	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	1.01		0.212	0.228	1.00	0.0576	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	85.7		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.469		0.140	0.146	1.00	0.0587	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0313	U	0.0452	0.0453	1.00	0.0730	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.657		0.165	0.174	1.00	0.0469	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	90.9		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-1.07	U	0.361	0.387		0.444	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Actinium-228	0.844		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-212	1.01	U	0.845	0.852		1.28	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Bismuth-214	0.962		0.224	0.245		0.234	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-210	0.436	U	1.96	1.96		3.51	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-212	1.03		0.199	0.239		0.203	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Lead-214	1.44		0.199	0.248		0.198	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Potassium-40	19.1		2.58	3.24		0.965	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Protactinium-231	0.765	U	0.694	0.699		3.21	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-226	0.962		0.224	0.245	1.00	0.234	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radium-228	0.844		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-232	0.844		0.253	0.267		0.417	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thorium-234	0.285	U	1.73	1.73		3.03	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Thallium-208	0.431		0.118	0.127		0.0838	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-235	0.297	U	0.375	0.376		0.559	pCi/g	05/29/14 13:01	06/20/14 15:39	1
Uranium-238	0.285	U	1.73	1.73		3.03	pCi/g	05/29/14 13:01	06/20/14 15:39	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 15:39	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-24**

**Lab Sample ID: 160-6793-59**

Matrix: Solid

Date Collected: 05/23/14 08:57

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.721		0.183	0.192	1.00	0.111	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.08		0.217	0.235	1.00	0.0561	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.776		0.184	0.195	1.00	0.0655	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	89.6		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.793		0.182	0.194	1.00	0.0538	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0258. U		0.0364	0.0365	1.00	0.0386	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.506		0.145	0.151	1.00	0.0310	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	93.7		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.180	U	0.292	0.293		0.609	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Actinium 228	1.18		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-212	1.03	U	1.42	1.42		2.36	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Bismuth-214	1.23		0.309	0.335		0.242	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-210	3.27	U	2.81	2.84		3.86	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-212	1.19		0.221	0.269		0.214	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Lead-214	1.21		0.250	0.280		0.218	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Potassium-40	19.4		3.33	3.88		1.06	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Protactinium-231	0.473	U	1.62	1.62		2.91	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-226	1.23		0.309	0.335	1.00	0.242	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radium-228	1.18		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-232	1.18		0.355	0.375		0.259	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thorium-234	0.664	U	1.08	1.08		3.53	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Thallium-208	0.409		0.137	0.144		0.134	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-235	0.198	U	0.342	0.343		0.644	pCi/g	05/29/14 13:01	06/20/14 15:43	1
Uranium-238	0.664	U	1.08	1.08		3.53	pCi/g	05/29/14 13:01	06/20/14 15:43	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 15:43	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-GRASS-25**

**Lab Sample ID: 160-6793-60**

Date Collected: 05/23/14 08:45

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.848		0.198	0.210	1.00	0.0861	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.17		0.232	0.252	1.00	0.0890	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.852		0.197	0.209	1.00	0.0725	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	% Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	83.2			30 - 110				05/29/14 12:52	06/05/14 20:49	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.481		0.140	0.146	1.00	0.0524	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0628		0.0562	0.0564	1.00	0.0377	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.635		0.160	0.169	1.00	0.0302	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	% Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	96.3			30 - 110				05/29/14 12:52	06/05/14 20:44	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.577	U	0.717	0.721		1.18	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Actinium-228	1.19		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Bismuth-212	0.965	U	0.762	0.768		1.16	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Bismuth-214	0.890		0.217	0.236		0.200	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-210	0.902	U	1.72	1.72		3.08	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-212	1.15		0.203	0.251		0.199	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Lead-214	1.14		0.214	0.245		0.193	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Potassium-40	16.7		2.01	2.64		0.808	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Protactinium-231	0.211	U	0.378	0.378		2.36	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Radium-226	0.890		0.217	0.236	1.00	0.200	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Radium-228	1.19		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thorium-232	1.19		0.278	0.303		0.201	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thorium-234	2.25	U	1.80	1.82		2.40	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Thallium-208	0.431		0.0883	0.0990		0.0668	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Uranium-235	0.245	U	0.275	0.276		0.515	pCi/g	05/29/14 13:01	06/20/14 16:06	1
Uranium-238	2.25	U	1.80	1.82		2.40	pCi/g	05/29/14 13:01	06/20/14 16:06	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:01	06/20/14 16:06	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-26**

**Lab Sample ID: 160-6793-61**

Date Collected: 05/23/14 09:58

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.810		0.188	0.200	1.00	0.0761	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.985		0.206	0.222	1.00	0.0654	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.893		0.195	0.209	1.00	0.0485	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.8		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.554		0.153	0.160	1.00	0.0700	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0288	U	0.0454	0.0455	1.00	0.0782	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.677		0.168	0.178	1.00	0.0699	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	91.8		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.00193	U	0.315	0.315		0.561	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Actinium-228	1.29		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Bismuth-212	1.41		0.842	0.854		1.15	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Bismuth-214	1.09		0.234	0.260		0.150	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-210	3.08		1.82	1.86		2.80	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-212	1.10		0.165	0.218		0.160	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Lead-214	1.20		0.181	0.219		0.179	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Potassium-40	12.9		2.08	2.47		1.07	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Protactinium-231	-0.0832	U	0.127	0.127		3.08	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Radium-226	1.09		0.234	0.260	1.00	0.150	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Radium-228	1.29		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thorium-232	1.29		0.271	0.301		0.203	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thorium-234	2.15	U	1.56	1.57		2.60	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Thallium-208	0.376		0.0824	0.0912		0.0343	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Uranium-235	0.250	U	0.358	0.359		0.590	pCi/g	05/29/14 13:01	06/20/14 16:17	1
Uranium-238	2.15	U	1.56	1.57		2.60	pCi/g	05/29/14 13:01	06/20/14 16:17	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None						pCi/g	05/29/14 13:01	06/20/14 16:17	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-27**

**Lab Sample ID: 160-6793-62**

Date Collected: 05/23/14 10:03

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.644		0.169	0.178	1.00	0.100	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.856		0.191	0.204	1.00	0.0711	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.600		0.159	0.166	1.00	0.0541	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.4		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.471		0.141	0.146	1.00	0.0478	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0629		0.0587	0.0589	1.00	0.0595	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.520		0.148	0.155	1.00	0.0545	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	89.6		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.301	U	0.220	0.223		0.325	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Actinium 228	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Bismuth-212	0.626	U	0.695	0.698		1.12	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Bismuth-214	1.39		0.228	0.270		0.155	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-210	2.47		1.75	1.77		2.46	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-212	1.06		0.150	0.203		0.142	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Lead-214	1.35		0.182	0.230		0.156	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Potassium-40	14.3		2.00	2.48		0.873	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Protactinium-231	0.391	U	0.424	0.426		2.54	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Radium-226	1.39		0.228	0.270	1.00	0.155	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Radium-228	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thorium-232	1.29		0.223	0.259		0.125	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thorium-234	2.18		1.28	1.30		2.05	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Thallium-208	0.400		0.100	0.108		0.0804	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Uranium-235	0.218	U	0.274	0.275		0.488	pCi/g	05/29/14 13:01	06/20/14 16:10	1
Uranium-238	2.18		1.28	1.30		2.05	pCi/g	05/29/14 13:01	06/20/14 16:10	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:10	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-28**

**Lab Sample ID: 160-6793-63**

Matrix: Solid

Date Collected: 05/23/14 08:05

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.869		0.198	0.211	1.00	0.0817	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.02		0.213	0.229	1.00	0.0576	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.708		0.178	0.188	1.00	0.0673	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	85.4		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.598		0.158	0.166	1.00	0.0539	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0645		0.0577	0.0580	1.00	0.0387	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.557		0.152	0.159	1.00	0.0471	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	88.1		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.864	U	0.872	0.879		1.42	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Actinium 228	0.841		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Bismuth-212	0.886	U	1.06	1.06		1.72	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Bismuth-214	1.20		0.266	0.294		0.219	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-210	1.20	U	2.01	2.02		3.57	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-212	0.877		0.209	0.238		0.217	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Lead-214	1.21		0.228	0.260		0.132	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Potassium-40	16.4		2.57	3.07		1.10	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Protactinium-231	0.325	U	0.887	0.888		3.00	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Radium-226	1.20		0.266	0.294	1.00	0.219	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Radium-228	0.841		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thorium-232	0.841		0.293	0.305		0.548	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thorium-234	0.828	U	0.981	0.984		3.17	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Thallium-208	0.420		0.122	0.130		0.0914	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Uranium-235	0.162	U	0.349	0.349		0.593	pCi/g	05/29/14 13:01	06/20/14 16:11	1
Uranium-238	0.828	U	0.981	0.984		3.17	pCi/g	05/29/14 13:01	06/20/14 16:11	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:11	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-29**

**Lab Sample ID: 160-6793-64**

Date Collected: 05/23/14 07:45

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.683		0.169	0.179	1.00	0.0728	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.902		0.192	0.207	1.00	0.0308	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.754		0.175	0.186	1.00	0.0306	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.2		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.818		0.189	0.202	1.00	0.0498	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0247	U	0.0388	0.0389	1.00	0.0620	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.873		0.195	0.209	1.00	0.0327	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	88.1		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.518	U	0.581	0.585		0.954	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Actinium 228	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Bismuth-212	1.62		0.658	0.679		0.743	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Bismuth-214	0.990		0.194	0.219		0.153	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-210	2.23		1.71	1.73		2.09	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-212	0.962		0.140	0.187		0.141	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Lead-214	1.04		0.162	0.195		0.142	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Potassium-40	16.7		1.94	2.58		0.882	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Protactinium-231	0.120	U	0.147	0.147		2.37	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Radium-226	0.990		0.194	0.219	1.00	0.153	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Radium-228	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thorium-232	1.19		0.250	0.278		0.283	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thorium-234	1.57	U	1.35	1.36		2.18	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Thallium-208	0.337		0.0850	0.0919		0.0668	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Uranium-235	0.00400	U	0.0120	0.0120		0.569	pCi/g	05/29/14 13:01	06/20/14 16:37	1
Uranium-238	1.57	U	1.35	1.36		2.18	pCi/g	05/29/14 13:01	06/20/14 16:37	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:37	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-GRASS-30**

**Lab Sample ID: 160-6793-65**

Date Collected: 05/23/14 07:52

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.772		0.186	0.197	1.00	0.0964	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	1.12		0.219	0.239	1.00	0.0487	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.678		0.170	0.180	1.00	0.0527	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
<i>Thorium-229</i>	89.2			30 - 110				05/29/14 12:52	06/05/14 20:49	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.725		0.180	0.190	1.00	0.0710	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0137	U	0.0273	0.0273	1.00	0.0410	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.826		0.191	0.203	1.00	0.0623	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
<i>Uranium-232</i>	88.1			30 - 110				05/29/14 12:52	06/05/14 20:44	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.462	U	0.353	0.358		1.84	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Actinium-228	1.30		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-212	0.752	U	0.803	0.807		1.28	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-214	1.11		0.270	0.293		0.242	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-210	3.42	U	2.63	2.66		3.55	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-212	0.971		0.173	0.214		0.197	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-214	1.17		0.221	0.252		0.200	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Potassium-40	13.8		2.03	2.47		0.828	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Protactinium-231	0.721	U	0.528	0.534		3.02	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-226	1.11		0.270	0.293	1.00	0.242	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-228	1.30		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-232	1.30		0.335	0.360		0.254	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-234	0.947	U	0.799	0.805		2.54	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thallium-208	0.420		0.105	0.114		0.0914	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-235	0.149	U	0.283	0.283		0.589	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-238	0.947	U	0.799	0.805		2.54	pCi/g	05/29/14 13:01	06/20/14 16:38	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Other Detected</i>	None						pCi/g	05/29/14 13:01	06/20/14 16:38	1
<i>Radionuclide</i>										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-1**

**Lab Sample ID: 160-6793-66**

Date Collected: 05/23/14 09:07

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.532		0.153	0.159	1.00	0.0810	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.602		0.161	0.169	1.00	0.0646	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.407		0.132	0.136	1.00	0.0511	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.3		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.373		0.135	0.138	1.00	0.0675	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0591		0.0591	0.0593	1.00	0.0443	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.386		0.136	0.140	1.00	0.0615	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	87.5		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0711	U	0.249	0.250		0.383	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Actinium 228	0.865		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-212	0.237	U	0.655	0.656		1.14	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Bismuth-214	0.652		0.157	0.171		0.146	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-210	1.11	U	1.26	1.27		2.01	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-212	0.735		0.118	0.152		0.103	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Lead-214	0.714		0.147	0.165		0.135	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Potassium-40	14.6		1.79	2.33		0.886	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Protactinium-231	0.00417	U	0.00967	0.00968		2.06	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-226	0.652		0.157	0.171	1.00	0.146	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radium-228	0.865		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-232	0.865		0.177	0.197		0.0992	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thorium-234	1.02	U	1.09	1.10		1.87	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Thallium-208	0.158		0.0650	0.0670		0.0851	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-235	0.195	U	0.298	0.299		0.442	pCi/g	05/29/14 13:01	06/20/14 16:38	1
Uranium-238	1.02	U	1.09	1.10		1.87	pCi/g	05/29/14 13:01	06/20/14 16:38	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:38	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-2**

**Lab Sample ID: 160-6793-67**

Matrix: Solid

Date Collected: 05/23/14 09:11

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.582		0.161	0.168	1.00	0.0981	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-230	0.597		0.159	0.167	1.00	0.0637	pCi/g	05/29/14 12:52	06/05/14 20:49	1
Thorium-232	0.475		0.141	0.146	1.00	0.0506	pCi/g	05/29/14 12:52	06/05/14 20:49	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	91.2		30 - 110					05/29/14 12:52	06/05/14 20:49	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.474		0.146	0.151	1.00	0.0669	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0136 U		0.0273	0.0273	1.00	0.0409	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.438		0.138	0.143	1.00	0.0328	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	86.7		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.258	U	0.398	0.399		0.661	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Actinium 228	0.472		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Bismuth-212	0.175 U		0.631	0.631		1.12	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Bismuth-214	0.588		0.178	0.188		0.183	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-210	3.18		1.83	1.86		2.32	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-212	0.561		0.144	0.161		0.158	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Lead-214	0.733		0.171	0.187		0.160	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Potassium-40	13.2		1.67	2.15		0.709	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Protactinium-231	0.575 U		0.602	0.605		2.55	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Radium-226	0.588		0.178	0.188	1.00	0.183	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Radium-228	0.472		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thorium-232	0.472		0.186	0.192		0.301	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thorium-234	0.728 U		1.27	1.27		2.20	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Thallium-208	0.273		0.0863	0.0908		0.0791	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Uranium-235	0.0550 U		0.256	0.256		0.442	pCi/g	05/29/14 13:01	06/20/14 16:39	1
Uranium-238	0.728 U		1.27	1.27		2.20	pCi/g	05/29/14 13:01	06/20/14 16:39	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:39	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-3**

**Lab Sample ID: 160-6793-68**

Date Collected: 05/23/14 09:13

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.539		0.157	0.163	1.00	0.0967	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.547		0.153	0.160	1.00	0.0322	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.527		0.151	0.158	1.00	0.0634	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	88.5		30 - 110					05/29/14 12:52	06/05/14 20:50	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.531		0.154	0.160	1.00	0.0506	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0415		0.0479	0.0480	1.00	0.0415	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.348		0.126	0.129	1.00	0.0631	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	88.1		30 - 110					05/29/14 12:52	06/05/14 20:44	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0148	U	0.575	0.575		0.973	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Actinium 228	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Bismuth-212	0.468	U	0.491	0.494		0.785	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Bismuth-214	0.585		0.122	0.137		0.114	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-210	0.703	U	1.19	1.19		2.13	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-212	0.554		0.103	0.126		0.124	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Lead-214	0.629		0.131	0.146		0.120	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Potassium-40	13.3		1.52	2.04		0.581	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Protactinium-231	-0.306	U	1.12	1.12		1.93	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Radium-226	0.585		0.122	0.137	1.00	0.114	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Radium-228	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thorium-232	0.820		0.182	0.201		0.0800	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thorium-234	0.673	U	0.522	0.527		2.04	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Thallium-208	0.239		0.0592	0.0642		0.0495	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Uranium-235	0.134	U	0.175	0.176		0.383	pCi/g	05/29/14 13:01	06/20/14 17:13	1
Uranium-238	0.673	U	0.522	0.527		2.04	pCi/g	05/29/14 13:01	06/20/14 17:13	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>(2σ+/-)</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 17:13	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-4**

**Lab Sample ID: 160-6793-69**

Matrix: Solid

Date Collected: 05/23/14 09:35

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.11		0.233	0.251	1.00	0.102	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	1.37		0.255	0.280	1.00	0.0541	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.749		0.189	0.199	1.00	0.0539	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<b>Tracer</b>		%Yield	Qualifier	Limits				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229		78.8		30 - 110				05/29/14 12:52	06/05/14 20:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	1.12		0.229	0.247	1.00	0.0350	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0118 U		0.0295	0.0296	1.00	0.0661	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	1.04		0.220	0.236	1.00	0.0349	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>		%Yield	Qualifier	Limits				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232		81.5		30 - 110				05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.0232	U	0.0994	0.0995		1.40	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Actinium 228	1.55		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Bismuth-212	2.06		0.657	0.691		0.459	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Bismuth-214	1.20		0.189	0.227		0.118	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-210	1.58 U		1.63	1.64		2.18	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-212	1.28		0.132	0.212		0.117	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Lead-214	1.23		0.160	0.205		0.128	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Potassium-40	15.7		1.88	2.48		0.668	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Protactinium-231	0.972 U		0.673	0.681		1.32	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Radium-226	1.20		0.189	0.227	1.00	0.118	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Radium-228	1.55		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thorium-232	1.55		0.239	0.287		0.193	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thorium-234	0.953 U		0.554	0.563		1.70	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Thallium-208	0.397		0.0826	0.0923		0.0606	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Uranium-235	0.103 U		0.173	0.173		0.408	pCi/g	05/29/14 13:01	06/20/14 16:50	1
Uranium-238	0.953 U		0.554	0.563		1.70	pCi/g	05/29/14 13:01	06/20/14 16:50	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None						pCi/g	05/29/14 13:01	06/20/14 16:50	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-5**

**Lab Sample ID: 160-6793-70**

Matrix: Solid

Date Collected: 05/23/14 09:33

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.922		0.202	0.217	1.00	0.105	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	1.17		0.223	0.243	1.00	0.0645	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.724		0.175	0.185	1.00	0.0479	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Thorium-229	83.9			30 - 110						

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.700		0.183	0.192	1.00	0.0670	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0586		0.0586	0.0588	1.00	0.0440	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.952		0.212	0.226	1.00	0.0353	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Uranium-232	82.8			30 - 110						

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.00466	U	0.0886	0.0886		1.15	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Actinium-228	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Bismuth-212	2.18		0.760	0.794		0.559	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Bismuth-214	1.36		0.203	0.248		0.112	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-210	2.77		1.64	1.67		2.55	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-212	1.30		0.150	0.225		0.130	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Lead-214	1.39		0.202	0.248		0.191	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Potassium-40	16.4		2.01	2.62		0.633	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Protactinium-231	0.601	U	0.953	0.955		1.60	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Radium-226	1.36		0.203	0.248	1.00	0.112	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Radium-228	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thorium-232	1.31		0.304	0.332		0.232	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thorium-234	1.03	U	0.799	0.806		2.51	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Thallium-208	0.475		0.106	0.116		0.0730	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Uranium-235	0.248	U	0.330	0.331		0.549	pCi/g	05/29/14 13:01	06/20/14 16:49	1
Uranium-238	1.03	U	0.799	0.806		2.51	pCi/g	05/29/14 13:01	06/20/14 16:49	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:49	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-6**

**Lab Sample ID: 160-6793-71**

Date Collected: 05/23/14 09:39

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.16		0.242	0.261	1.00	0.118	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	1.10		0.232	0.250	1.00	0.0552	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	1.05		0.225	0.242	1.00	0.0627	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	79.0		30 - 110					05/29/14 12:52	06/05/14 20:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.904		0.201	0.215	1.00	0.0335	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.0278	U	0.0393	0.0394	1.00	0.0417	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.686		0.176	0.185	1.00	0.0579	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	87.3		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.0105	U	0.0168	0.0169		0.598	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Actinium-228	1.01		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-212	0.482	U	0.671	0.673		1.12	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-214	1.28		0.209	0.247		0.142	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-210	0.901	U	1.60	1.60		2.79	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-212	1.15		0.153	0.214		0.153	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-214	1.40		0.180	0.231		0.152	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Potassium-40	15.6		1.97	2.54		0.790	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Protactinium-231	0.678	U	0.683	0.687		2.35	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-226	1.28		0.209	0.247	1.00	0.142	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-228	1.01		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-232	1.01		0.264	0.284		0.284	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-234	1.40	U	0.628	0.645		1.94	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thallium-208	0.393		0.101	0.109		0.0902	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-235	0.0904	U	0.336	0.336		0.541	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-238	1.40	U	0.628	0.645		1.94	pCi/g	05/29/14 13:01	06/20/14 16:45	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected		None					pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-7**

**Lab Sample ID: 160-6793-72**

Date Collected: 05/23/14 08:41

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.579		0.158	0.166	1.00	0.0902	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.583		0.155	0.163	1.00	0.0468	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.427		0.133	0.137	1.00	0.0465	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	92.7			30 - 110				05/29/14 12:52	06/05/14 20:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.480		0.144	0.149	1.00	0.0601	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	-0.00247	U	0.00493	0.00494	1.00	0.0599	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.327		0.117	0.121	1.00	0.0317	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	89.4			30 - 110				05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0220	U	0.0256	0.0257		0.687	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Actinium-228	0.786		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-212	0.0521	U	0.656	0.656		1.22	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Bismuth-214	0.819		0.187	0.206		0.145	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-210	1.91	U	1.89	1.91		2.47	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-212	0.647		0.173	0.192		0.173	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Lead-214	0.960		0.173	0.200		0.100	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Potassium-40	14.0		2.05	2.50		0.822	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Protactinium-231	0.463	U	0.728	0.730		2.01	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-226	0.819		0.187	0.206	1.00	0.145	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radium-228	0.786		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-232	0.786		0.200	0.216		0.132	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thorium-234	0.645	U	0.619	0.623		2.16	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Thallium-208	0.289		0.0876	0.0926		0.0658	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-235	0.0640	U	0.162	0.162		0.490	pCi/g	05/29/14 13:01	06/20/14 16:45	1
Uranium-238	0.645	U	0.619	0.623		2.16	pCi/g	05/29/14 13:01	06/20/14 16:45	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 16:45	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-8**

**Lab Sample ID: 160-6793-73**

Date Collected: 05/23/14 08:38

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.473		0.143	0.148	1.00	0.0323	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.587		0.160	0.167	1.00	0.0559	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.426		0.135	0.140	1.00	0.0321	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	88.6		30 - 110					05/29/14 12:52	06/05/14 20:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.332		0.118	0.121	1.00	0.0476	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-235/236	0.000 U		0.00487	0.00487	1.00	0.0390	pCi/g	05/29/14 12:52	06/05/14 20:44	1
Uranium-238	0.498		0.145	0.150	1.00	0.0475	pCi/g	05/29/14 12:52	06/05/14 20:44	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	92.3		30 - 110					05/29/14 12:52	06/05/14 20:44	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.436 U		0.405	0.409		0.659	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Actinium-228	0.501		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-212	0.235 U		0.524	0.525		0.905	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-214	0.701		0.152	0.168		0.128	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-210	1.15 U		1.19	1.20		1.94	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-212	0.609		0.0980	0.126		0.100	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-214	0.642		0.115	0.133		0.110	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Potassium-40	14.7		1.59	2.19		0.678	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Protactinium-231	0.437 U		0.785	0.786		1.64	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-226	0.701		0.152	0.168	1.00	0.128	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-228	0.501		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-232	0.501		0.149	0.158		0.193	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-234	0.593 U		0.478	0.482		1.68	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thallium-208	0.231		0.0538	0.0589		0.0303	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-235	0.0766 U		0.249	0.249		0.424	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-238	0.593 U		0.478	0.482		1.68	pCi/g	05/29/14 13:01	06/20/14 17:11	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None					pCi/g		05/29/14 13:01	06/20/14 17:11	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-9**

**Lab Sample ID: 160-6793-74**

Date Collected: 05/23/14 07:47

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert. (2σ+/-)	Uncert. (2σ+/-)							
Thorium-228	0.514		0.160	0.166	1.00	0.0985	pCi/g	05/29/14 13:01	06/09/14 17:50	1	
Thorium-230	0.726		0.185	0.195	1.00	0.0533	pCi/g	05/29/14 13:01	06/09/14 17:50	1	
Thorium-232	0.653		0.175	0.184	1.00	0.0533	pCi/g	05/29/14 13:01	06/09/14 17:50	1	
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	
Thorium-229	81.0		30 - 110						05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert. (2σ+/-)	Uncert. (2σ+/-)							
Uranium-233/234	0.370		0.146	0.149	1.00	0.0796	pCi/g	05/29/14 13:01	06/09/14 17:53	1	
Uranium-235/236	0.0174	U	0.0348	0.0349	1.00	0.0523	pCi/g	05/29/14 13:01	06/09/14 17:53	1	
Uranium-238	0.467		0.163	0.168	1.00	0.0795	pCi/g	05/29/14 13:01	06/09/14 17:53	1	
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	
Uranium-232	69.0		30 - 110						05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.183	U	0.217	0.219		0.370	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Actinium-228	0.734		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-212	0.836	U	0.722	0.727		1.12	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Bismuth-214	0.771		0.169	0.187		0.147	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-210	0.278	U	1.57	1.57		2.94	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-212	0.649		0.131	0.156		0.155	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Lead-214	0.649		0.145	0.160		0.189	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Potassium-40	13.4		1.81	2.27		0.677	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Protactinium-231	0.355	U	0.797	0.798		1.40	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-226	0.771		0.169	0.187	1.00	0.147	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radium-228	0.734		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-232	0.734		0.206	0.219		0.114	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thorium-234	0.948	U	1.27	1.27		1.97	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Thallium-208	0.265		0.0712	0.0763		0.0688	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-235	0.0828	U	0.264	0.264		0.465	pCi/g	05/29/14 13:01	06/20/14 17:11	1
Uranium-238	0.948	U	1.27	1.27		1.97	pCi/g	05/29/14 13:01	06/20/14 17:11	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 17:11	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-10**

**Lab Sample ID: 160-6793-75**

Date Collected: 05/23/14 08:26

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.05		0.224	0.241	1.00	0.0951	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.24		0.241	0.262	1.00	0.0609	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.881		0.203	0.216	1.00	0.0529	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	80.2		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.798		0.200	0.211	1.00	0.0837	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	-0.00287	U	0.00574	0.00575	1.00	0.0697	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.882		0.208	0.221	1.00	0.0559	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	79.7		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.506	U	0.738	0.741		1.22	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Actinium 228	1.79		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Bismuth-212	1.67		0.885	0.902		1.24	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Bismuth-214	1.45		0.235	0.279		0.176	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-210	1.46	U	1.90	1.91		3.30	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-212	1.47		0.179	0.261		0.174	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Lead-214	1.52		0.201	0.256		0.207	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Potassium-40	18.6		2.18	2.90		1.03	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Protactinium-231	1.24	U	1.24	1.24		2.30	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Radium-226	1.45		0.235	0.279	1.00	0.176	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Radium-228	1.79		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thorium-232	1.79		0.312	0.362		0.296	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thorium-234	1.20	U	0.735	0.745		2.23	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Thallium-208	0.563		0.114	0.128		0.0914	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Uranium-235	0.297	U	0.385	0.386		0.635	pCi/g	05/29/14 13:01	06/20/14 17:12	1
Uranium-238	1.20	U	0.735	0.745		2.23	pCi/g	05/29/14 13:01	06/20/14 17:12	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:01	06/20/14 17:12	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-11**

**Lab Sample ID: 160-6793-76**

Date Collected: 05/23/14 07:43

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.633		0.173	0.181	1.00	0.0785	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.566		0.162	0.168	1.00	0.0346	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.666		0.175	0.184	1.00	0.0345	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.8		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.364		0.138	0.142	1.00	0.0729	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0289	U	0.0455	0.0456	1.00	0.0726	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.318		0.131	0.134	1.00	0.0870	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	73.7		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0798	U	0.248	0.249		0.358	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Actinium-228	0.652		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Bismuth-212	0.429	U	0.519	0.521		0.849	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Bismuth-214	0.602		0.160	0.172		0.149	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-210	0.612	U	1.17	1.17		2.09	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-212	0.510		0.0920	0.113		0.103	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Lead-214	0.686		0.112	0.133		0.121	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Potassium-40	13.4		1.53	2.05		0.710	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Protactinium-231	0.775	U	0.650	0.655		1.39	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Radium-226	0.602		0.160	0.172	1.00	0.149	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Radium-228	0.652		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thorium-232	0.652		0.184	0.196		0.181	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thorium-234	1.09	U	1.04	1.04		1.46	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Thallium-208	0.229		0.0573	0.0621		0.0504	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Uranium-235	0.174	U	0.204	0.204		0.327	pCi/g	05/29/14 13:15	06/20/14 10:52	1
Uranium-238	1.09	U	1.04	1.04		1.46	pCi/g	05/29/14 13:15	06/20/14 10:52	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>
Other Detected	None							pCi/g	05/29/14 13:15	06/20/14 10:52
Radionuclide										1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-12**

**Lab Sample ID: 160-6793-77**

Matrix: Solid

Date Collected: 05/23/14 08:21

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.21		0.240	0.260	1.00	0.0799	pCi/g	05/29/14 13:01	06/10/14 15:24	1
Thorium-230	1.36		0.253	0.277	1.00	0.0535	pCi/g	05/29/14 13:01	06/10/14 15:24	1
Thorium-232	1.17		0.234	0.254	1.00	0.0532	pCi/g	05/29/14 13:01	06/10/14 15:24	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	81.7		30 - 110					05/29/14 13:01	06/10/14 15:24	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.988		0.215	0.231	1.00	0.0708	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0234	U	0.0415	0.0416	1.00	0.0750	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	1.11		0.227	0.245	1.00	0.0601	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	80.5		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.499		0.289	0.296		0.437	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Actinium-228	1.35		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-212	0.554	U	0.662	0.665		1.08	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-214	1.58		0.213	0.269		0.142	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-210	2.08	U	1.71	1.72		2.44	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-212	1.18		0.156	0.219		0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-214	1.46		0.207	0.256		0.183	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Potassium-40	16.6		1.81	2.48		0.665	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Protactinium-231	0.623	U	0.869	0.871		2.38	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-226	1.58		0.213	0.269	1.00	0.142	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-228	1.35		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-232	1.35		0.311	0.340		0.223	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-234	0.956	U	0.858	0.864		2.82	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thallium-208	0.550		0.111	0.125		0.0926	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-235	0.126	U	0.309	0.310		0.553	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-238	0.956	U	0.858	0.864		2.82	pCi/g	05/29/14 13:16	06/20/14 10:53	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-13**

**Lab Sample ID: 160-6793-78**

Date Collected: 05/23/14 08:29

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.47		0.257	0.286	1.00	0.103	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.77		0.279	0.316	1.00	0.0568	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	1.65		0.269	0.303	1.00	0.0704	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	86.3		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	1.46		0.251	0.280	1.00	0.0490	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0511 U		0.0538	0.0540	1.00	0.0610	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	1.74		0.274	0.311	1.00	0.0656	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	83.5		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.114 U		0.220	0.220		1.70	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Actinium-228	1.23		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-212	1.50		0.736	0.753		0.789	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Bismuth-214	1.22		0.218	0.252		0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-210	0.500 U		1.68	1.69		2.53	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-212	1.35		0.161	0.238		0.154	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Lead-214	1.52		0.193	0.249		0.182	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Potassium-40	20.0		2.21	3.02		0.773	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Protactinium-231	1.09 U		0.728	0.737		2.69	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-226	1.22		0.218	0.252	1.00	0.173	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radium-228	1.23		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-232	1.23		0.265	0.293		0.111	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thorium-234	1.15 U		0.721	0.731		2.50	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Thallium-208	0.494		0.0990	0.111		0.0712	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-235	0.261 U		0.335	0.336		0.549	pCi/g	05/29/14 13:16	06/20/14 10:53	1
Uranium-238	1.15 U		0.721	0.731		2.50	pCi/g	05/29/14 13:16	06/20/14 10:53	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:16	06/20/14 10:53	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-14**

**Lab Sample ID: 160-6793-79**

Matrix: Solid

Date Collected: 05/23/14 08:17

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	1.25		0.237	0.259	1.00	0.0944	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.35		0.244	0.269	1.00	0.0572	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	1.06		0.216	0.233	1.00	0.0498	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	84.7		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	1.34		0.249	0.273	1.00	0.0737	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0372	U	0.0497	0.0498	1.00	0.0736	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	1.00		0.215	0.231	1.00	0.0735	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	84.4		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.703		0.204	0.224		0.105	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Actinium 228	1.41		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Bismuth-212	0.687	U	0.854	0.857		1.40	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Bismuth-214	1.71		0.236	0.295		0.114	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-210	1.92	U	2.47	2.48		3.22	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-212	1.37		0.184	0.256		0.191	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Lead-214	1.59		0.215	0.271		0.177	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Potassium-40	19.1		2.39	3.09		0.828	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Protactinium-231	0.888	U	0.774	0.780		2.97	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Radium-226	1.71		0.236	0.295	1.00	0.114	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Radium-228	1.41		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thorium-232	1.41		0.289	0.323		0.305	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thorium-234	1.34	U	0.879	0.890		2.96	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Thallium-208	0.555		0.105	0.120		0.0519	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Uranium-235	0.159	U	0.408	0.409		0.689	pCi/g	05/29/14 13:16	06/20/14 10:54	1
Uranium-238	1.34	U	0.879	0.890		2.96	pCi/g	05/29/14 13:16	06/20/14 10:54	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:16	06/20/14 10:54	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-15**

**Lab Sample ID: 160-6793-80**

Date Collected: 05/23/14 10:08

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.925		0.215	0.228	1.00	0.101	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.02		0.224	0.240	1.00	0.0924	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.728		0.188	0.197	1.00	0.0616	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	79.2			30 - 110				05/29/14 13:01	06/09/14 17:50	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.409		0.139	0.143	1.00	0.0775	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0426		0.0491	0.0493	1.00	0.0426	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.774		0.188	0.199	1.00	0.0341	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	82.0			30 - 110				05/29/14 13:01	06/09/14 17:53	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.634	U	0.598	0.604		0.972	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Actinium 228	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-212	0.591	U	0.761	0.764		1.25	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-214	1.28		0.226	0.262		0.127	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-210	3.04		1.69	1.73		2.25	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-212	1.11		0.155	0.211		0.138	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-214	1.28		0.222	0.259		0.151	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Potassium-40	14.1		2.16	2.60		0.613	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Protactinium-231	0.497	U	0.889	0.890		2.27	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-226	1.28		0.226	0.262	1.00	0.127	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-228	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-232	1.35		0.266	0.299		0.147	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-234	1.21	U	1.36	1.37		2.32	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thallium-208	0.416		0.0971	0.106		0.0563	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-235	0.195	U	0.284	0.284		0.417	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-238	1.21	U	1.36	1.37		2.32	pCi/g	05/29/14 13:06	06/20/14 11:49	1
<i>Other Detected</i>			<i>Count</i>	<i>Total</i>						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-16**

**Lab Sample ID: 160-6793-81**

Date Collected: 05/23/14 11:05

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.785		0.190	0.201	1.00	0.0692	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.985		0.213	0.229	1.00	0.0772	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.808		0.192	0.203	1.00	0.0586	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	83.4		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.555		0.157	0.164	1.00	0.0703	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0380	U	0.0471	0.0472	1.00	0.0616	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.647		0.168	0.177	1.00	0.0563	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	89.4		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0467	U	0.208	0.208		1.14	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Actinium 228	0.673		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-212	0.154	U	0.710	0.710		1.31	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Bismuth-214	1.02		0.257	0.278		0.177	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-210	3.25		1.71	1.75		2.05	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-212	0.778		0.150	0.181		0.139	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Lead-214	0.996		0.192	0.218		0.144	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Potassium-40	13.1		2.20	2.57		0.945	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Protactinium-231	0.0853	U	0.945	0.945		1.78	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-226	1.02		0.257	0.278	1.00	0.177	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radium-228	0.673		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-232	0.673		0.250	0.259		0.164	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thorium-234	2.07	U	0.843	0.870		2.17	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Thallium-208	0.274		0.106	0.109		0.0936	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-235	0.189	U	0.334	0.335		0.582	pCi/g	05/29/14 13:06	06/20/14 11:51	1
Uranium-238	2.07	U	0.843	0.870		2.17	pCi/g	05/29/14 13:06	06/20/14 11:51	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 11:51	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-17**

**Lab Sample ID: 160-6793-82**

Date Collected: 05/23/14 11:00

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.787		0.194	0.205	1.00	0.0914	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	1.02		0.218	0.235	1.00	0.0658	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.732		0.184	0.194	1.00	0.0598	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	82.5		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.739		0.185	0.195	1.00	0.0652	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0232	U	0.0411	0.0411	1.00	0.0741	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.629		0.170	0.178	1.00	0.0343	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	84.6		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0880	U	0.109	0.109		0.567	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Actinium-228	0.948		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Bismuth-212	0.799	U	0.750	0.754		1.17	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Bismuth-214	0.761		0.229	0.243		0.229	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-210	2.17	U	1.80	1.82		2.80	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-212	0.922		0.222	0.252		0.221	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Lead-214	1.04		0.179	0.209		0.142	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Potassium-40	14.1		1.94	2.42		0.741	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Protactinium-231	0.186	U	0.184	0.185		3.15	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Radium-226	0.761		0.229	0.243	1.00	0.229	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Radium-228	0.948		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thorium-232	0.948		0.221	0.241		0.124	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thorium-234	1.56	U	1.51	1.51		2.14	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Thallium-208	0.369		0.107	0.114		0.102	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Uranium-235	-0.104	U	3.91	3.91		0.597	pCi/g	05/29/14 13:06	06/20/14 11:46	1
Uranium-238	1.56	U	1.51	1.51		2.14	pCi/g	05/29/14 13:06	06/20/14 11:46	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 11:46	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-18**

**Lab Sample ID: 160-6793-83**

Date Collected: 05/23/14 11:08

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.612		0.160	0.168	1.00	0.100	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.855		0.183	0.197	1.00	0.0507	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.517		0.143	0.149	1.00	0.0592	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	98.7			30 - 110				05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.602		0.167	0.174	1.00	0.0595	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0374	U	0.0499	0.0500	1.00	0.0740	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.521		0.155	0.161	1.00	0.0593	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	83.7			30 - 110				05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.176	U	0.232	0.233		0.322	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Actinium 228	1.29		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Bismuth-212	1.23		0.574	0.588		0.500	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Bismuth-214	0.983		0.199	0.224		0.166	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-210	1.61	U	1.76	1.77		2.54	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-212	0.973		0.138	0.187		0.129	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Lead-214	1.05		0.156	0.190		0.160	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Potassium-40	13.8		1.84	2.32		0.986	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Protactinium-231	0.910	U	0.973	0.978		2.18	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Radium-226	0.983		0.199	0.224	1.00	0.166	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Radium-228	1.29		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thorium-232	1.29		0.242	0.275		0.194	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thorium-234	0.454	U	0.588	0.590		2.65	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Thallium-208	0.215		0.0723	0.0756		0.0922	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Uranium-235	0.305	U	0.263	0.265		0.454	pCi/g	05/29/14 13:06	06/20/14 11:47	1
Uranium-238	0.454	U	0.588	0.590		2.65	pCi/g	05/29/14 13:06	06/20/14 11:47	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None					pCi/g		05/29/14 13:06	06/20/14 11:47	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-19**

**Lab Sample ID: 160-6793-84**

Date Collected: 05/23/14 09:34

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.658		0.177	0.185	1.00	0.0878	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.690		0.181	0.190	1.00	0.0908	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.761		0.188	0.199	1.00	0.0740	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	81.3			30 - 110				05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.519		0.161	0.167	1.00	0.0823	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0301	U	0.0426	0.0427	1.00	0.0452	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.531		0.160	0.166	1.00	0.0362	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	80.4			30 - 110				05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.137	U	0.212	0.212		0.431	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Actinium 228	1.11		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-212	0.304	U	0.666	0.667		1.16	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-214	0.766		0.186	0.202		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-210	3.74		2.07	2.11		2.72	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-212	0.725		0.145	0.173		0.179	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-214	0.853		0.155	0.178		0.166	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Potassium-40	11.8		1.88	2.23		1.12	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Protactinium-231	0.676	U	0.552	0.557		2.28	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-226	0.766		0.186	0.202	1.00	0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-228	1.11		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-232	1.11		0.298	0.319		0.187	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-234	1.08	U	1.40	1.41		2.42	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thallium-208	0.298		0.0774	0.0833		0.0689	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-235	0.176	U	0.286	0.287		0.566	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-238	1.08	U	1.40	1.41		2.42	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-20**

**Lab Sample ID: 160-6793-85**

Date Collected: 05/23/14 09:32

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.730		0.187	0.197	1.00	0.0828	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.633		0.173	0.181	1.00	0.0712	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.764		0.189	0.199	1.00	0.0528	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	82.6			30 - 110				05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.528		0.152	0.159	1.00	0.0696	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0134	U	0.0268	0.0268	1.00	0.0402	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.569		0.156	0.163	1.00	0.0322	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	86.3			30 - 110				05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0631	U	0.264	0.264		1.48	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Actinium 228</b>	<b>0.877</b>		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Bismuth-212	0.337	U	0.638	0.639		1.10	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Bismuth-214</b>	<b>0.847</b>		0.183	0.203		0.142	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Lead-210	0.852	U	1.78	1.78		2.69	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Lead-212</b>	<b>0.857</b>		0.136	0.175		0.132	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Lead-214</b>	<b>0.786</b>		0.168	0.187		0.147	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Potassium-40	12.3		1.87	2.26		0.891	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Protactinium-231	0.226	U	0.354	0.355		2.01	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-226	0.847		0.183	0.203	1.00	0.142	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Radium-228	0.877		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Thorium-232</b>	<b>0.877</b>		0.273	0.287		0.194	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Thorium-234	1.15	U	0.720	0.730		2.19	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<b>Thallium-208</b>	<b>0.314</b>		0.0817	0.0880		0.0663	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-235	0.154	U	0.222	0.223		0.399	pCi/g	05/29/14 13:06	06/20/14 11:48	1
Uranium-238	1.15	U	0.720	0.730		2.19	pCi/g	05/29/14 13:06	06/20/14 11:48	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected Radionuclide	None						pCi/g	05/29/14 13:06	06/20/14 11:48	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-21**

**Lab Sample ID: 160-6793-86**

Date Collected: 05/23/14 09:03

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.636		0.163	0.172	1.00	0.0944	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.641		0.160	0.169	1.00	0.0638	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.487		0.139	0.145	1.00	0.0509	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						Prepared	Analyzed
Thorium-229	95.4		30 - 110						05/29/14 13:01	06/09/14 17:50
										1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.611		0.175	0.182	1.00	0.0703	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0125	U	0.0313	0.0313	1.00	0.0700	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.464		0.152	0.157	1.00	0.0641	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						Prepared	Analyzed
Uranium-232	77.9		30 - 110						05/29/14 13:01	06/09/14 17:53
										1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.689	U	0.687	0.693		1.12	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Actinium 228	0.779		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-212	0.241	U	0.871	0.872		1.55	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Bismuth-214	0.883		0.187	0.208		0.131	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-210	-0.257	U	2.55	2.55		3.28	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-212	0.792		0.162	0.191		0.163	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Lead-214	0.948		0.182	0.207		0.140	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Potassium-40	14.0		2.38	2.78		1.36	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Protactinium-231	0.442	U	1.06	1.06		2.01	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-226	0.883		0.187	0.208	1.00	0.131	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Radium-228	0.779		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-232	0.779		0.294	0.304		0.327	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thorium-234	0.719	U	0.867	0.870		2.66	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Thallium-208	0.319		0.0886	0.0945		0.0567	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-235	0.198	U	0.255	0.256		0.536	pCi/g	05/29/14 13:06	06/20/14 11:49	1
Uranium-238	0.719	U	0.867	0.870		2.66	pCi/g	05/29/14 13:06	06/20/14 11:49	1
<i>Other Detected Radionuclides</i>	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None		Uncert. (2σ+/-)	Uncert. (2σ+/-)			pCi/g	05/29/14 13:06	06/20/14 11:49	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-22**

**Lab Sample ID: 160-6793-87**

Date Collected: 05/23/14 09:12

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.718		0.174	0.185	1.00	0.0762	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.844		0.187	0.200	1.00	0.0537	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	0.650		0.165	0.174	1.00	0.0628	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	91.7		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.717		0.190	0.199	1.00	0.0646	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.00968	U	0.0320	0.0320	1.00	0.0804	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.726		0.191	0.200	1.00	0.0706	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	78.9		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0389	U	1.26	1.26		2.15	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Actinium 228	0.718		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Bismuth-212	0.902	U	1.32	1.32		2.21	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Bismuth-214	0.966		0.259	0.278		0.191	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-210	2.79	U	2.41	2.43		3.49	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-212	0.899		0.197	0.228		0.199	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Lead-214	0.758		0.271	0.283		0.274	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Potassium-40	11.2		2.71	2.95		1.77	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Protactinium-231	0.692	U	0.644	0.648		3.67	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Radium-226	0.966		0.259	0.278	1.00	0.191	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Radium-228	0.718		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thorium-232	0.718		0.315	0.323		0.343	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thorium-234	0.864	U	0.892	0.896		2.91	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Thallium-208	0.271		0.107	0.110		0.101	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Uranium-235	0.288	U	0.340	0.341		0.667	pCi/g	05/29/14 13:06	06/20/14 12:53	1
Uranium-238	0.864	U	0.892	0.896		2.91	pCi/g	05/29/14 13:06	06/20/14 12:53	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>						
Other Detected	None				RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:06	06/20/14 12:53	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-23**

**Lab Sample ID: 160-6793-88**

Date Collected: 05/23/14 09:07

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.874		0.209	0.221	1.00	0.0866	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.881		0.207	0.220	1.00	0.0366	pCi/g	05/29/14 13:01	06/09/14 17:50	1
Thorium-232	1.16		0.237	0.256	1.00	0.0364	pCi/g	05/29/14 13:01	06/09/14 17:50	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	74.9		30 - 110					05/29/14 13:01	06/09/14 17:50	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.677		0.177	0.186	1.00	0.0600	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0144	U	0.0287	0.0288	1.00	0.0431	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.562		0.161	0.168	1.00	0.0525	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	84.2		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0163	U	0.692	0.692		1.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Actinium-228	0.429		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-212	0.585	U	0.622	0.625		0.993	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-214	0.869		0.169	0.191		0.112	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-210	0.637	U	1.30	1.30		2.01	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-212	0.703		0.111	0.144		0.109	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-214	0.994		0.144	0.177		0.106	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Potassium-40	12.0		1.85	2.22		0.799	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Protactinium-231	0.634	U	0.825	0.828		1.79	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-226	0.869		0.169	0.191	1.00	0.112	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-228	0.429		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-232	0.429		0.232	0.236		0.308	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-234	0.603	U	0.584	0.587		1.85	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thallium-208	0.280		0.0676	0.0735		0.0386	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-235	0.127	U	0.204	0.205		0.351	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-238	0.603	U	0.584	0.587		1.85	pCi/g	05/29/14 13:06	06/20/14 12:52	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-24**

**Lab Sample ID: 160-6793-89**

Date Collected: 05/23/14 09:25

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.189		0.101	0.103	1.00	0.0904	pCi/g	05/29/14 13:01	06/12/14 16:28	1
Thorium-230	0.170		0.106	0.107	1.00	0.125	pCi/g	05/29/14 13:01	06/12/14 16:28	1
Thorium-232	0.111	U	0.0900	0.0905	1.00	0.122	pCi/g	05/29/14 13:01	06/12/14 16:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	77.9		30 - 110					05/29/14 13:01	06/12/14 16:28	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.133		0.0872	0.0879	1.00	0.0885	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.000	U	0.00581	0.00581	1.00	0.0465	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.140		0.0866	0.0874	1.00	0.0759	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	76.0		30 - 110					05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.000	U	0.417	0.417		1.29	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Actinium 228	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-212	-0.00632	U	1.72	1.72		3.43	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Bismuth-214	0.208	U	0.327	0.328		0.574	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-210	7.79		4.75	4.84		5.12	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-212	-0.0214	U	0.271	0.271		0.380	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Lead-214	0.127	U	0.296	0.296		0.518	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Potassium-40	-0.793	U	31.7	31.7		3.01	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Protactinium-231	1.27	U	1.72	1.72		3.44	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-226	0.208	U	0.327	0.328	1.00	0.574	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radium-228	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-232	0.0546	U	0.169	0.169		1.21	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thorium-234	2.43	U	3.07	3.08		5.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Thallium-208	0.0596	U	0.138	0.138		0.123	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-235	-0.205	U	8.21	8.21		1.54	pCi/g	05/29/14 13:06	06/20/14 12:52	1
Uranium-238	2.43	U	3.07	3.08		5.17	pCi/g	05/29/14 13:06	06/20/14 12:52	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 12:52	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-25**

**Lab Sample ID: 160-6793-90**

Date Collected: 05/23/14 09:18

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.0655	U	0.0599	0.0601	1.00	0.0795	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	0.179		0.0883	0.0896	1.00	0.0634	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	0.0799		0.0586	0.0590	1.00	0.0502	pCi/g	05/29/14 13:01	06/09/14 17:51	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Thorium-229	91.5			30 - 110				05/29/14 13:01	06/09/14 17:51	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.103		0.0722	0.0728	1.00	0.0733	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.000	U	0.00528	0.00528	1.00	0.0423	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.0862		0.0642	0.0646	1.00	0.0587	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits						
Uranium-232	84.0			30 - 110				05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.00706	U	0.0142	0.0142		1.29	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Actinium-228	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-212	0.00838	U	1.24	1.24		2.52	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-214	0.00541	U	0.0554	0.0554		0.639	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-210	3.68	U	6.39	6.40		9.77	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-212	0.0595	U	0.214	0.214		0.411	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-214	-0.0318	U	0.213	0.213		0.581	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Potassium-40	1.44	U	2.28	2.29		4.12	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Protactinium-231	0.299	U	1.41	1.41		5.32	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-226	0.00541	U	0.0554	0.0554	1.00	0.639	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-228	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-232	0.0865	U	0.272	0.272		0.945	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-234	5.14		3.06	3.11		4.80	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thallium-208	-0.114	U	4.55	4.55		0.367	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-235	0.0467	U	0.0677	0.0679		1.19	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-238	5.14		3.06	3.11		4.80	pCi/g	05/29/14 13:06	06/20/14 12:49	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-26**

**Lab Sample ID: 160-6793-91**

Date Collected: 05/23/14 08:40

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.675		0.176	0.185	1.00	0.0645	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	0.563		0.161	0.167	1.00	0.0590	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	0.467		0.146	0.151	1.00	0.0514	pCi/g	05/29/14 13:01	06/09/14 17:51	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.7		30 - 110					05/29/14 13:01	06/09/14 17:51	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.522		0.152	0.159	1.00	0.0333	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0276	U	0.0391	0.0392	1.00	0.0415	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.482		0.147	0.153	1.00	0.0631	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	85.3		30 - 110					05/29/14 13:01	06/09/14 17:53	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.623	U	0.577	0.582		0.938	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Actinium-228	0.798		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Bismuth-212	0.287	U	0.571	0.571		0.985	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Bismuth-214	0.686		0.159	0.174		0.150	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-210	2.56		1.70	1.73		2.30	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-212	0.701		0.120	0.150		0.128	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Lead-214	0.690		0.138	0.155		0.145	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Potassium-40	11.1		1.63	1.98		1.03	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Protactinium-231	0.279	U	0.682	0.683		2.03	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Radium-226	0.686		0.159	0.174	1.00	0.150	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Radium-228	0.798		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thorium-232	0.798		0.183	0.200		0.327	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thorium-234	0.728	U	0.595	0.599		1.91	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Thallium-208	0.212		0.0734	0.0766		0.0815	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Uranium-235	0.0596	U	0.248	0.248		0.429	pCi/g	05/29/14 13:06	06/20/14 12:50	1
Uranium-238	0.728	U	0.595	0.599		1.91	pCi/g	05/29/14 13:06	06/20/14 12:50	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None					pCi/g		05/29/14 13:06	06/20/14 12:50	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-27**

**Lab Sample ID: 160-6793-92**

Date Collected: 05/23/14 08:35

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.518		0.157	0.163	1.00	0.0985	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-230	0.703		0.179	0.189	1.00	0.0761	pCi/g	05/29/14 13:01	06/09/14 17:51	1
Thorium-232	0.717		0.180	0.189	1.00	0.0633	pCi/g	05/29/14 13:01	06/09/14 17:51	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	88.2			30 - 110				05/29/14 13:01	06/09/14 17:51	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.423		0.138	0.142	1.00	0.0509	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-235/236	0.0530	U	0.0559	0.0561	1.00	0.0633	pCi/g	05/29/14 13:01	06/09/14 17:53	1
Uranium-238	0.589		0.163	0.170	1.00	0.0508	pCi/g	05/29/14 13:01	06/09/14 17:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	84.1			30 - 110				05/29/14 13:01	06/09/14 17:53	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.381	U	0.505	0.507		0.834	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Actinium 228	0.957		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Bismuth-212	0.174	U	0.551	0.551		0.979	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Bismuth-214	0.909		0.185	0.208		0.153	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-210	0.977	U	1.76	1.77		2.57	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-212	0.785		0.149	0.180		0.145	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Lead-214	0.871		0.156	0.181		0.183	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Potassium-40	14.6		1.76	2.31		0.711	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Protactinium-231	0.420	U	0.428	0.431		2.16	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Radium-226	0.909		0.185	0.208	1.00	0.153	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Radium-228	0.957		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thorium-232	0.957		0.208	0.230		0.0980	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thorium-234	1.14	U	1.34	1.35		2.28	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Thallium-208	0.240		0.0747	0.0788		0.0743	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Uranium-235	0.0527	U	0.246	0.246		0.386	pCi/g	05/29/14 13:06	06/20/14 12:51	1
Uranium-238	1.14	U	1.34	1.35		2.28	pCi/g	05/29/14 13:06	06/20/14 12:51	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:06	06/20/14 12:51	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-28**

**Lab Sample ID: 160-6793-93**

Date Collected: 05/23/14 08:32

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.622		0.148	0.157	1.00	0.0668	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-230	0.714		0.156	0.167	1.00	0.0283	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-232	0.588		0.142	0.150	1.00	0.0474	pCi/g	05/29/14 13:04	06/12/14 16:33	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	85.5		30 - 110					05/29/14 13:04	06/12/14 16:33	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.392		0.154	0.157	1.00	0.144	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0379	U	0.0547	0.0548	1.00	0.0883	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.618		0.182	0.190	1.00	0.119	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	77.2		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0157	U	0.0714	0.0714		0.322	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Actinium 228	0.846		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Bismuth-212	0.406	U	0.652	0.654		1.10	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Bismuth-214	0.742		0.157	0.175		0.122	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-210	0.00836	U	1.15	1.15		2.18	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-212	0.694		0.138	0.164		0.142	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Lead-214	0.916		0.169	0.194		0.117	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Potassium-40	15.1		1.94	2.48		0.788	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Protactinium-231	0.188	U	0.259	0.260		2.04	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Radium-226	0.742		0.157	0.175	1.00	0.122	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Radium-228	0.846		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thorium-232	0.846		0.223	0.239		0.113	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thorium-234	0.432	U	0.367	0.370		2.20	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Thallium-208	0.303		0.0765	0.0827		0.0601	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Uranium-235	0.125	U	0.228	0.229		0.430	pCi/g	05/29/14 13:06	06/20/14 12:48	1
Uranium-238	0.432	U	0.367	0.370		2.20	pCi/g	05/29/14 13:06	06/20/14 12:48	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 12:48	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-SOIL-29**

**Lab Sample ID: 160-6793-94**

Date Collected: 05/23/14 08:25

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.684		0.149	0.160	1.00	0.0749	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.706		0.149	0.160	1.00	0.0436	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.603		0.137	0.146	1.00	0.0375	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	89.7		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.423		0.140	0.144	1.00	0.0946	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	-0.00752	U	0.00868	0.00870	1.00	0.0760	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.513		0.150	0.156	1.00	0.0729	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	86.3		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.490	U	0.620	0.624		1.02	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Actinium-228	0.635		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-212	0.229	U	0.679	0.680		1.21	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Bismuth-214	0.783		0.179	0.196		0.141	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-210	1.36	U	1.56	1.56		2.27	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-212	0.733		0.155	0.182		0.157	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Lead-214	0.834		0.181	0.201		0.151	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Potassium-40	12.6		2.04	2.41		1.34	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Protactinium-231	0.573	U	0.757	0.759		2.22	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-226	0.783		0.179	0.196	1.00	0.141	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radium-228	0.635		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-232	0.635		0.215	0.224		0.134	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thorium-234	0.196	U	0.603	0.603		2.47	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Thallium-208	0.243		0.0768	0.0808		0.0605	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-235	0.285	U	0.311	0.313		0.474	pCi/g	05/29/14 13:06	06/20/14 12:49	1
Uranium-238	0.196	U	0.603	0.603		2.47	pCi/g	05/29/14 13:06	06/20/14 12:49	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 12:49	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-SOIL-30**

**Lab Sample ID: 160-6793-95**

Date Collected: 05/23/14 08:15

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.644		0.146	0.156	1.00	0.0746	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.851		0.166	0.181	1.00	0.0626	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.530		0.130	0.138	1.00	0.0437	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	89.9		30 . 110					05/29/14 13:04	06/12/14 16:34	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.492		0.147	0.153	1.00	0.0783	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.000 U		0.00494	0.00494	1.00	0.0395	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.529		0.151	0.158	1.00	0.0684	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	87.3		30 . 110					05/29/14 13:04	06/12/14 16:31	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.0804 U		0.213	0.213		1.02	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Actinium-228	0.556 U		0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-212	0.477 U		1.16	1.17		2.06	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-214	0.803		0.298	0.310		0.299	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-210	2.57 U		2.79	2.81		3.70	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-212	0.681		0.231	0.247		0.254	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-214	0.937		0.204	0.226		0.119	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Potassium-40	10.9		2.50	2.74		1.08	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Protactinium-231	0.162 U		1.19	1.19		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-226	0.803		0.298	0.310	1.00	0.299	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-228	0.556 U		0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-232	0.556 U		0.313	0.318		0.618	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-234	0.871 U		0.909	0.913		3.31	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thallium-208	0.330		0.107	0.113		0.0944	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-235	0.204 U		0.358	0.359		0.606	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-238	0.871 U		0.909	0.913		3.31	pCi/g	05/29/14 13:06	06/20/14 13:59	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-2**

**Lab Sample ID: 160-6793-96**

Date Collected: 05/23/14 12:24

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.815		0.156	0.170	1.00	0.0490	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.04		0.176	0.196	1.00	0.0551	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.705		0.144	0.156	1.00	0.0409	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						Prepared	Analyzed
Thorium-229	95.1		30 - 110						05/29/14 13:04	06/12/14 16:34
										1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.717		0.188	0.198	1.00	0.0785	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0123	U	0.0307	0.0307	1.00	0.0688	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.669		0.182	0.190	1.00	0.0739	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						Prepared	Analyzed
Uranium-232	78.3		30 - 110						05/29/14 13:04	06/12/14 16:31
										1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0555	U	0.636	0.636		1.47	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Actinium 228	1.15		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Bismuth-212	0.781	U	0.695	0.700		1.08	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Bismuth-214	1.22		0.227	0.260		0.152	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-210	3.32		2.08	2.11		2.66	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-212	0.986		0.135	0.186		0.128	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Lead-214	1.44		0.214	0.261		0.151	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Potassium-40	14.9		2.11	2.60		0.820	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Protactinium-231	0.561	U	0.797	0.799		1.33	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Radium-226	1.22		0.227	0.260	1.00	0.152	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Radium-228	1.15		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thorium-232	1.15		0.301	0.323		0.197	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thorium-234	1.66	U	1.11	1.12		1.82	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Thallium-208	0.443		0.0994	0.110		0.0649	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Uranium-235	0.258	U	0.242	0.244		0.404	pCi/g	05/29/14 13:06	06/20/14 13:58	1
Uranium-238	1.66	U	1.11	1.12		1.82	pCi/g	05/29/14 13:06	06/20/14 13:58	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide						pCi/g		05/29/14 13:06	06/20/14 13:58	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-3**

**Lab Sample ID: 160-6793-97**

Date Collected: 05/23/14 12:40

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.942		0.181	0.197	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.14		0.197	0.219	1.00	0.0523	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.837		0.168	0.182	1.00	0.0471	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.5		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.485		0.153	0.159	1.00	0.0764	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0239	U	0.0423	0.0423	1.00	0.0764	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.625		0.174	0.181	1.00	0.0763	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	77.9		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0425	U	0.375	0.375		0.569	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Actinium 228	1.23		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-212	1.11	U	0.912	0.920		1.39	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Bismuth-214	1.21		0.213	0.247		0.0688	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-210	6.53		2.13	2.26		2.37	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-212	1.10		0.163	0.216		0.147	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Lead-214	0.984		0.209	0.232		0.151	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Potassium-40	14.4		2.36	2.78		1.67	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Protactinium-231	0.658	U	0.581	0.585		3.15	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-226	1.21		0.213	0.247	1.00	0.0688	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radium-228	1.23		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-232	1.23		0.315	0.339		0.224	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thorium-234	1.64	U	1.42	1.43		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Thallium-208	0.374		0.0955	0.103		0.0581	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-235	0.231	U	0.363	0.363		0.612	pCi/g	05/29/14 13:06	06/20/14 13:59	1
Uranium-238	1.64	U	1.42	1.43		2.44	pCi/g	05/29/14 13:06	06/20/14 13:59	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 13:59	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-4**

**Lab Sample ID: 160-6793-98**

Date Collected: 05/23/14 12:42

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	1.02		0.177	0.197	1.00	0.0847	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.00		0.171	0.191	1.00	0.0408	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.841		0.157	0.172	1.00	0.0484	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	98.3		30 - 110					05/29/14 13:04	06/12/14 16:34	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.537		0.160	0.166	1.00	0.0818	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0573		0.0573	0.0575	1.00	0.0430	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.748		0.188	0.199	1.00	0.0908	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	83.1		30 - 110					05/29/14 13:04	06/12/14 16:31	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.218	U	0.303	0.304		0.503	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Actinium 228	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-212	0.613	U	0.677	0.680		1.09	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-214	1.10		0.200	0.230		0.162	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-210	3.67		1.54	1.60		1.87	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-212	1.25		0.155	0.224		0.127	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-214	1.27		0.196	0.236		0.137	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Potassium-40	18.5		2.13	2.84		0.961	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Protactinium-231	0.713	U	0.452	0.458		2.82	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-226	1.10		0.200	0.230	1.00	0.162	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-228	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-232	1.13		0.213	0.243		0.345	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-234	1.62	U	1.21	1.22		1.67	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thallium-208	0.397		0.0978	0.106		0.0653	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-235	0.0474	U	0.356	0.356		0.562	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-238	1.62	U	1.21	1.22		1.67	pCi/g	05/29/14 13:06	06/20/14 13:54	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None					pCi/g		05/29/14 13:06	06/20/14 13:54	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-5**

**Lab Sample ID: 160-6793-99**

Matrix: Solid

Date Collected: 05/23/14 13:02

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.752		0.161	0.173	1.00	0.0713	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.985		0.184	0.202	1.00	0.0738	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.710		0.155	0.166	1.00	0.0593	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	83.6		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.524		0.150	0.156	1.00	0.0603	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0190	U	0.0383	0.0383	1.00	0.0751	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.595		0.160	0.168	1.00	0.0646	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	90.8		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.314	U	0.285	0.288		1.79	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Actinium 228	1.11		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-212	0.538	U	0.659	0.661		1.07	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Bismuth-214	1.14		0.209	0.240		0.166	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-210	1.55	U	1.82	1.83		2.93	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-212	1.04		0.178	0.223		0.167	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Lead-214	1.17		0.190	0.225		0.149	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Potassium-40	13.7		1.97	2.41		1.01	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Protactinium-231	0.382	U	0.390	0.392		2.89	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-226	1.14		0.209	0.240	1.00	0.166	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Radium-228	1.11		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-232	1.11		0.247	0.272		0.258	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thorium-234	1.34	U	1.66	1.67		2.86	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Thallium-208	0.360		0.0897	0.0971		0.0840	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-235	-0.0409	U	0.140	0.140		0.620	pCi/g	05/29/14 13:06	06/20/14 13:54	1
Uranium-238	1.34	U	1.66	1.67		2.86	pCi/g	05/29/14 13:06	06/20/14 13:54	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>						
Other Detected	None				RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:06	06/20/14 13:54	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-6**

**Lab Sample ID: 160-6793-100**

Date Collected: 05/23/14 12:59

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.709		0.154	0.165	1.00	0.0640	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.797		0.162	0.175	1.00	0.0543	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.548		0.134	0.141	1.00	0.0392	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	84.8			30 - 110				05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.639		0.173	0.181	1.00	0.0656	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.00896	U	0.0297	0.0297	1.00	0.0745	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.507		0.155	0.160	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	79.0			30 - 110				05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.606	U	0.589	0.594		0.959	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Actinium 228	1.26		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Bismuth-212	1.57		0.783	0.800		0.764	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Bismuth-214	0.728		0.151	0.169		0.0577	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-210	2.91		1.66	1.69		1.95	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-212	0.963		0.136	0.185		0.113	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Lead-214	1.12		0.188	0.221		0.179	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Potassium-40	15.5		2.11	2.64		0.741	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Protactinium-231	0.728	U	0.584	0.590		2.50	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Radium-226	0.728		0.151	0.169	1.00	0.0577	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Radium-228	1.26		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thorium-232	1.26		0.305	0.331		0.128	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thorium-234	2.10		1.54	1.56		2.07	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Thallium-208	0.287		0.0867	0.0916		0.0957	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Uranium-235	0.236	U	0.313	0.314		0.557	pCi/g	05/29/14 13:09	06/20/14 10:54	1
Uranium-238	2.10		1.54	1.56		2.07	pCi/g	05/29/14 13:09	06/20/14 10:54	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 10:54	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-7**

**Lab Sample ID: 160-6793-101**

Date Collected: 05/23/14 12:55

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.671		0.153	0.163	1.00	0.0879	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.845		0.167	0.182	1.00	0.0579	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.424		0.117	0.123	1.00	0.0392	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Thorium-229	85.9		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.657		0.161	0.168	1.00	0.0775	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0257	U	0.0404	0.0405	1.00	0.0645	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.553		0.159	0.166	1.00	0.0591	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					Prepared	Analyzed	Dil Fac
Uranium-232	85.3		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0325	U	0.0620	0.0622		0.556	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Actinium 228	0.638		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Bismuth-212	0.549	U	0.723	0.725		1.19	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Bismuth-214	0.777		0.157	0.176		0.106	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-210	3.83		2.12	2.17		2.42	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-212	0.567		0.133	0.152		0.138	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Lead-214	0.971		0.189	0.214		0.136	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Potassium-40	11.4		1.79	2.13		0.767	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Protactinium-231	0.396	U	0.705	0.706		1.99	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Radium-226	0.777		0.157	0.176	1.00	0.106	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Radium-228	0.638		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thorium-232	0.638		0.278	0.285		0.351	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thorium-234	0.763	U	0.580	0.586		2.08	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Thallium-208	0.301		0.0791	0.0850		0.0495	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Uranium-235	0.0794	U	0.130	0.130		0.547	pCi/g	05/29/14 13:09	06/20/14 01:35	1
Uranium-238	0.763	U	0.580	0.586		2.08	pCi/g	05/29/14 13:09	06/20/14 01:35	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 01:35	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-8**

**Lab Sample ID: 160-6793-102**

Date Collected: 05/23/14 12:51

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert. (2σ+/-)	Uncert. (2σ+/-)							
Thorium-228	0.645		0.151	0.161	1.00	0.0704	pCi/g	05/29/14 13:04	06/12/14 16:34	1	
Thorium-230	1.03		0.189	0.208	1.00	0.0482	pCi/g	05/29/14 13:04	06/12/14 16:34	1	
Thorium-232	0.582		0.143	0.151	1.00	0.0572	pCi/g	05/29/14 13:04	06/12/14 16:34	1	
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	
Thorium-229	80.8		30 - 110						05/29/14 13:04	06/12/14 16:34	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert. (2σ+/-)	Uncert. (2σ+/-)							
Uranium-233/234	0.679		0.177	0.186	1.00	0.0650	pCi/g	05/29/14 13:04	06/12/14 16:31	1	
Uranium-235/236	0.0373	U	0.0498	0.0499	1.00	0.0739	pCi/g	05/29/14 13:04	06/12/14 16:31	1	
Uranium-238	0.689		0.178	0.188	1.00	0.0649	pCi/g	05/29/14 13:04	06/12/14 16:31	1	
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	79.4		30 - 110						05/29/14 13:04	06/12/14 16:31	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.106	U	0.125	0.126		0.748	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium 228	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	0.596	U	0.861	0.864		1.44	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	0.787		0.236	0.250		0.216	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	6.60		3.01	3.11		3.50	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	0.354		0.149	0.156		0.186	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	0.838		0.208	0.225		0.153	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	9.33		2.18	2.38		1.52	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.117	U	1.30	1.30		2.41	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	0.787		0.236	0.250	1.00	0.216	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	0.0511	U	0.0897	0.0899		0.460	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	0.954	U	1.18	1.19		2.08	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	0.178		0.0760	0.0782		0.0767	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	0.208	U	0.324	0.324		0.542	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	0.954	U	1.18	1.19		2.08	pCi/g	05/29/14 13:09	06/20/14 02:16	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert. (2σ+/-)</i>	<i>Uncert. (2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-9**

Date Collected: 05/23/14 12:47

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-103**

Matrix: Solid

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.880		0.171	0.186	1.00	0.0640	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-230	1.18		0.197	0.220	1.00	0.0543	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-232	0.670		0.148	0.158	1.00	0.0392	pCi/g	05/29/14 13:04	06/13/14 16:53	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	88.4		30 - 110					05/29/14 13:04	06/13/14 16:53	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.830		0.196	0.208	1.00	0.0735	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0821		0.0694	0.0698	1.00	0.0643	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.569		0.162	0.169	1.00	0.0692	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	84.4		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0278	U	0.212	0.212		0.427	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium 228	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	1.00	U	0.747	0.754		1.13	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	1.08		0.208	0.237		0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	3.50		1.73	1.78		2.27	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	0.972		0.132	0.182		0.127	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	1.07		0.171	0.204		0.170	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	17.4		2.12	2.77		0.474	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.752	U	0.625	0.630		2.33	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	1.08		0.208	0.237	1.00	0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	0.809		0.279	0.291		0.317	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	1.43	U	1.27	1.28		1.84	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	0.413		0.118	0.126		0.0939	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	0.140	U	0.184	0.185		0.276	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	1.43	U	1.27	1.28		1.84	pCi/g	05/29/14 13:09	06/20/14 02:16	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radionuclide										

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-10**

**Lab Sample ID: 160-6793-104**

Date Collected: 05/23/14 12:03

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.918		0.183	0.198	1.00	0.0931	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-230	1.01		0.188	0.206	1.00	0.0614	pCi/g	05/29/14 13:04	06/13/14 16:53	1
Thorium-232	0.789		0.165	0.178	1.00	0.0415	pCi/g	05/29/14 13:04	06/13/14 16:53	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	80.3			30 - 110				05/29/14 13:04	06/13/14 16:53	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.581		0.158	0.166	1.00	0.0607	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0373	U	0.0462	0.0464	1.00	0.0604	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.786		0.183	0.195	1.00	0.0485	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	90.8			30 - 110				05/29/14 13:04	06/12/14 16:31	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.441	U	0.513	0.516		0.842	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Actinium-228	0.405		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-212	0.596	U	0.769	0.772		1.27	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Bismuth-214	0.916		0.205	0.226		0.154	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-210	1.40	U	1.42	1.43		2.31	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-212	0.923		0.138	0.182		0.136	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Lead-214	1.10		0.190	0.222		0.155	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Potassium-40	14.8		2.00	2.50		0.694	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Protactinium-231	0.660	U	0.903	0.906		2.55	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-226	0.916		0.205	0.226	1.00	0.154	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Radium-228	0.405		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-232	0.405		0.235	0.238		0.323	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thorium-234	1.55	U	1.53	1.54		2.11	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Thallium-208	0.337		0.0788	0.0862		0.0449	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-235	-0.0474	U	1.89	1.89		0.525	pCi/g	05/29/14 13:09	06/20/14 02:16	1
Uranium-238	1.55	U	1.53	1.54		2.11	pCi/g	05/29/14 13:09	06/20/14 02:16	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:09	06/20/14 02:16	1

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# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-11**

**Lab Sample ID: 160-6793-105**

Date Collected: 05/23/14 12:12

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.999		0.175	0.194	1.00	0.0636	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.08		0.181	0.202	1.00	0.0499	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.762		0.151	0.164	1.00	0.0386	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	91.6		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.619		0.178	0.186	1.00	0.0885	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.103		0.0824	0.0829	1.00	0.0805	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.520		0.161	0.167	1.00	0.0566	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	76.5		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.452	U	0.604	0.607		0.998	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Actinium 228	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-212	0.626	U	0.667	0.670		1.07	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-214	1.09		0.199	0.229		0.160	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-210	2.24		1.30	1.33		1.60	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-212	1.32		0.146	0.224		0.117	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-214	1.23		0.183	0.223		0.132	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Potassium-40	16.8		1.97	2.61		1.02	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Protactinium-231	0.298	U	0.361	0.363		2.51	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-226	1.09		0.199	0.229	1.00	0.160	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-228	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-232	1.41		0.239	0.279		0.0943	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-234	1.54	U	0.734	0.752		2.25	pCi/g	05/29/14 13:09	06/20/14 02:12	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-14**

**Lab Sample ID: 160-6793-106**

Date Collected: 05/23/14 11:49

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	1.02		0.180	0.199	1.00	0.0487	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.48		0.216	0.249	1.00	0.0441	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.852		0.164	0.179	1.00	0.0379	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	90.3		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.594		0.164	0.172	1.00	0.0786	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0198	U	0.0399	0.0400	1.00	0.0783	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.614		0.165	0.173	1.00	0.0573	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	88.3		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	-0.281	U	0.644	0.645		1.08	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Actinium 228	0.551		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-212	1.56		0.811	0.827		1.10	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-214	1.03		0.219	0.243		0.192	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-210	2.86	U	2.13	2.16		2.92	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-212	0.888		0.163	0.199		0.199	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-214	1.15		0.186	0.221		0.196	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Potassium-40	17.9		2.11	2.79		0.687	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Protactinium-231	0.567	U	0.773	0.775		2.74	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-226	1.03		0.219	0.243	1.00	0.192	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-228	0.551		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-232	0.551		0.267	0.273		0.359	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-234	0.802	U	1.50	1.51		2.62	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thallium-208	0.364		0.0873	0.0951		0.0745	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-235	0.139	U	0.188	0.188		0.599	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-238	0.802	U	1.50	1.51		2.62	pCi/g	05/29/14 13:09	06/20/14 02:13	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclide							pCi/g	05/29/14 13:09	06/20/14 02:13	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-15**

Date Collected: 05/23/14 11:44

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-107**

Matrix: Solid

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.845		0.169	0.183	1.00	0.0799	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.02		0.183	0.203	1.00	0.0607	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.542		0.133	0.141	1.00	0.0498	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	87.9		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.626		0.159	0.168	1.00	0.0570	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0600		0.0560	0.0562	1.00	0.0568	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.657		0.163	0.172	1.00	0.0520	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	94.6		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.202	U	0.226	0.228		1.54	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Actinium 228	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Bismuth-212	0.862	U	0.884	0.888		1.41	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Bismuth-214	0.978		0.209	0.233		0.152	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-210	2.88		1.96	1.99		2.57	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-212	0.994		0.141	0.191		0.126	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Lead-214	1.15		0.197	0.231		0.153	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Potassium-40	16.5		2.26	2.82		0.570	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Protactinium-231	0.0614	U	0.184	0.184		2.46	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Radium-226	0.978		0.209	0.233	1.00	0.152	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Radium-228	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thorium-232	0.945		0.265	0.282		0.137	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thorium-234	1.60	U	1.45	1.46		2.06	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Thallium-208	0.321		0.0683	0.0943		0.0643	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Uranium-235	0.263	U	0.255	0.257		0.420	pCi/g	05/29/14 13:09	06/20/14 10:55	1
Uranium-238	1.60	U	1.45	1.46		2.06	pCi/g	05/29/14 13:09	06/20/14 10:55	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>
Other Detected	None							pCi/g	05/29/14 13:09	06/20/14 10:55
Radionuclide										1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-16**

**Lab Sample ID: 160-6793-108**

Date Collected: 05/23/14 11:40

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.868		0.169	0.184	1.00	0.0746	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	1.13		0.190	0.212	1.00	0.0386	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.713		0.151	0.163	1.00	0.0529	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	83.4		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-233/234	0.523		0.156	0.162	1.00	0.0655	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0519	U	0.0578	0.0580	1.00	0.0744	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.651		0.175	0.184	1.00	0.0817	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	82.3		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.148	U	0.280	0.281		1.38	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Actinium-228	1.20		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Bismuth-212	0.000	U	0.715	0.715		1.22	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Bismuth-214	1.17		0.219	0.251		0.182	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-210	2.24	U	2.15	2.16		2.83	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-212	0.898		0.157	0.195		0.188	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Lead-214	1.04		0.233	0.257		0.209	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Potassium-40	15.9		1.95	2.54		0.802	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Protactinium-231	0.766	U	0.574	0.580		2.44	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Radium-226	1.17		0.219	0.251	1.00	0.182	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Radium-228	1.20		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thorium-232	1.20		0.256	0.284		0.111	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thorium-234	0.406	U	0.692	0.694		2.25	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Thallium-208	0.430		0.0904	0.101		0.0685	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Uranium-235	0.202	U	0.292	0.293		0.552	pCi/g	05/29/14 13:09	06/20/14 02:14	1
Uranium-238	0.406	U	0.692	0.694		2.25	pCi/g	05/29/14 13:09	06/20/14 02:14	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 02:14	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-17**

Date Collected: 05/23/14 11:29

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-109**

Matrix: Solid

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.965		0.186	0.202	1.00	0.0885	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.855		0.172	0.186	1.00	0.0571	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.721		0.157	0.168	1.00	0.0411	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	80.3		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.525		0.154	0.160	1.00	0.0678	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0829		0.0677	0.0681	1.00	0.0415	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.690		0.176	0.185	1.00	0.0677	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	84.5		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0727	U	0.131	0.132		0.437	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Actinium 228	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-212	0.234	U	0.587	0.588		1.02	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Bismuth-214	0.740		0.145	0.164		0.111	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-210	-0.885	U	20.7	20.7		2.01	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-212	0.482		0.0909	0.110		0.0955	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Lead-214	0.780		0.139	0.161		0.102	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Potassium-40	8.55		1.35	1.61		0.670	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Protactinium-231	-0.113	U	1.02	1.02		1.80	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-226	0.740		0.145	0.164	1.00	0.111	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Radium-228	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-232	0.648		0.175	0.187		0.203	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thorium-234	0.569	U	0.493	0.497		1.46	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Thallium-208	0.242		0.0641	0.0689		0.0511	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-235	0.109	U	0.219	0.219		0.369	pCi/g	05/29/14 13:09	06/20/14 02:12	1
Uranium-238	0.569	U	0.493	0.497		1.46	pCi/g	05/29/14 13:09	06/20/14 02:12	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>						
Other Detected Radionuclide	None				RL	MDC	Unit	Prepared	Analyzed	Dil Fac

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

**Client Sample ID: BMAC-OUTFALL-18**

**Lab Sample ID: 160-6793-110**

Date Collected: 05/23/14 11:33

Matrix: Solid

Date Received: 05/23/14 13:40

**Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.817		0.162	0.176	1.00	0.0614	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.742		0.153	0.165	1.00	0.0485	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.591		0.136	0.145	1.00	0.0378	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	91.6		30 - 110					05/29/14 13:04	06/12/14 16:34	1

**Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-233/234	0.693		0.178	0.187	1.00	0.0519	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.128		0.0851	0.0858	1.00	0.0426	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.694		0.178	0.187	1.00	0.0341	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	84.6		30 - 110					05/29/14 13:04	06/12/14 16:31	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0967	U	0.183	0.183		0.538	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Actinium-228	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-212	0.00643	U	0.709	0.709		1.33	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Bismuth-214	0.918		0.194	0.216		0.144	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-210	3.40		1.75	1.80		2.28	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-212	0.672		0.173	0.193		0.170	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Lead-214	1.04		0.171	0.203		0.157	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Potassium-40	-0.252	U	10.1	10.1		4.64	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Protactinium-231	-0.521	U	1.43	1.43		2.46	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-226	0.918		0.194	0.216	1.00	0.144	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Radium-228	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-232	0.593		0.218	0.227		0.294	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thorium-234	0.828	U	0.755	0.760		2.40	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Thallium-208	0.306		0.0733	0.0799		0.0321	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-235	0.157	U	0.316	0.316		0.532	pCi/g	05/29/14 13:09	06/20/14 02:13	1
Uranium-238	0.828	U	0.755	0.760		2.40	pCi/g	05/29/14 13:09	06/20/14 02:13	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	Result	Qualifier	Uncert.	Uncert.						
None			(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
None							pCi/g	05/29/14 13:09	06/20/14 02:13	1

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-19**

Date Collected: 05/23/14 13:09

Date Received: 05/23/14 13:40

**Lab Sample ID: 160-6793-111**

Matrix: Solid

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.994		0.182	0.201	1.00	0.0466	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.958		0.180	0.197	1.00	0.0556	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.735		0.156	0.168	1.00	0.0401	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Thorium-229	82.5		30 - 110					05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.487		0.149	0.154	1.00	0.0638	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.0253	U	0.0398	0.0399	1.00	0.0635	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.544		0.157	0.163	1.00	0.0581	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	84.8		30 - 110					05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0614	U	0.139	0.139		0.841	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Actinium-228	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Bismuth-212	0.262	U	1.08	1.08		1.99	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Bismuth-214	1.04		0.282	0.302		0.229	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-210	4.99		2.66	2.72		3.50	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-212	0.938		0.199	0.233		0.204	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Lead-214	1.29		0.216	0.254		0.0898	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Potassium-40	13.3		2.75	3.07		1.05	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Protactinium-231	0.443	U	1.03	1.03		3.31	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Radium-226	1.04		0.282	0.302	1.00	0.229	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Radium-228	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thorium-232	0.608	U	0.318	0.324		0.622	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thorium-234	2.76		1.73	1.76		2.53	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Thallium-208	0.388		0.117	0.124		0.0970	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Uranium-235	0.219	U	0.437	0.437		0.747	pCi/g	05/29/14 13:09	06/20/14 10:56	1
Uranium-238	2.76		1.73	1.76		2.53	pCi/g	05/29/14 13:09	06/20/14 10:56	1
<b>Other Detected</b>			<b>Count</b>	<b>Total</b>						
<b>Radionuclides</b>	<b>Result</b>	<b>Qualifier</b>	<b>Uncert.</b>	<b>(2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected	None						pCi/g	05/29/14 13:09	06/20/14 10:56	1
Radionuclide										

TestAmerica St. Louis

# Client Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

**Client Sample ID: BMAC-OUTFALL-20**

**Lab Sample ID: 160-6793-112**

Date Collected: 05/23/14 13:11

Matrix: Solid

Date Received: 05/23/14 13:40

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Thorium-228	0.869		0.164	0.179	1.00	0.0640	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-230	0.853		0.161	0.177	1.00	0.0564	pCi/g	05/29/14 13:04	06/12/14 16:34	1
Thorium-232	0.697		0.145	0.156	1.00	0.0419	pCi/g	05/29/14 13:04	06/12/14 16:34	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Thorium-229	97.9			30 - 110				05/29/14 13:04	06/12/14 16:34	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-233/234	0.535		0.165	0.171	1.00	0.0652	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.109		0.0826	0.0831	1.00	0.0468	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.644		0.181	0.189	1.00	0.0712	pCi/g	05/29/14 13:04	06/12/14 16:31	1
<i>Tracer</i>	%Yield	Qualifier		Limits				Prepared	Analyzed	Dil Fac
Uranium-232	76.6			30 - 110				05/29/14 13:04	06/12/14 16:31	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.111	U	0.251	0.251		1.73	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Actinium 228	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Bismuth-212	0.675	U	0.754	0.757		1.21	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Bismuth-214	1.12		0.203	0.234		0.152	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-210	4.46		2.83	2.88		3.64	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-212	1.01		0.199	0.238		0.202	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Lead-214	1.30		0.237	0.273		0.206	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Potassium-40	14.4		2.05	2.53		0.805	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Protactinium-231	0.341	U	0.442	0.444		2.76	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Radium-226	1.12		0.203	0.234	1.00	0.152	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Radium-228	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thorium-232	1.10		0.238	0.263		0.135	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thorium-234	0.788	U	0.823	0.827		2.91	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Thallium-208	0.231		0.0975	0.100		0.139	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Uranium-235	0.0278	U	0.310	0.310		0.556	pCi/g	05/29/14 13:09	06/20/14 10:51	1
Uranium-238	0.788	U	0.823	0.827		2.91	pCi/g	05/29/14 13:09	06/20/14 10:51	1
<i>Other Detected</i>			Count	Total						
<i>Radionuclides</i>	<i>Result</i>	<i>Qualifier</i>	<i>Uncert.</i>	<i>Uncert.</i>						
Other Detected	None		(2σ+/-)	(2σ+/-)	RL	MDC	Unit	05/29/14 13:09	06/20/14 10:51	1
Radionuclide							pCi/g			

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-123904/1-A

Matrix: Solid

Analysis Batch: 124692

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 123904

Analyte	MB MB		Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Uncert.	(2σ+/-)			Uncert.	(2σ+/-)						
Thorium-228	0.01533	U	0.0310		0.0310	1.00	0.0607	pCi/g		05/27/14 09:22	05/30/14 18:36	1
Thorium-230	0.06204		0.0524		0.0527	1.00	0.0486	pCi/g		05/27/14 09:22	05/30/14 18:36	1
Thorium-232	0.0000	U	0.00398		0.00398	1.00	0.0319	pCi/g		05/27/14 09:22	05/30/14 18:36	1
Tracer	MB MB	%Yield	Result	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229		89.3			30 - 110					05/27/14 09:22	05/30/14 18:36	1

Lab Sample ID: LCS 160-123904/2-A

Matrix: Solid

Analysis Batch: 124693

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 123904

Analyte	Spike LCS		Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits	%Rec
	Added	Uncert.			(2σ+/-)							
Thorium-230	24.5		25.23		2.62	1.00	0.107	pCi/g		103	81 - 118	
Tracer	LCS LCS	%Yield	Result	Qualifier	Limits							
Thorium-229		82.8			30 - 110							

Lab Sample ID: 160-6793-1 DU

Matrix: Solid

Analysis Batch: 124938

Client Sample ID: BMAC-DISCRETE-00

Prep Type: Total/NA

Prep Batch: 123904

Analyte	Sample Sample		DU Result	DU Qual	Total		RL	MDC	Unit	RER	Limit
	Result	Qual			Uncert.	(2σ+/-)					
Thorium-228	1.05		0.8168		0.153	1.00	0.0640	pCi/g		0.72	1
Thorium-230	0.960		1.028		0.173	1.00	0.0299	pCi/g		0.20	1
Thorium-232	0.894		0.8323		0.152	1.00	0.0300	pCi/g		0.20	1
Tracer	DU DU	%Yield	Result	Qualifier	Limits						
Thorium-229		78.7			30 - 110						

Lab Sample ID: MB 160-124407/1-A

Matrix: Solid

Analysis Batch: 125576

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124407

Analyte	MB MB		Result	Qualifier	Count		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Uncert.	(2σ+/-)			Uncert.	(2σ+/-)						
Thorium-228	0.04775	U	0.0486		0.0488	1.00	0.0612	pCi/g		05/29/14 12:48	06/05/14 20:46	1
Thorium-230	0.1077		0.0681		0.0687	1.00	0.0323	pCi/g		05/29/14 12:48	06/05/14 20:46	1
Thorium-232	0.03214		0.0371		0.0372	1.00	0.0321	pCi/g		05/29/14 12:48	06/05/14 20:46	1
Tracer	MB MB	%Yield	Result	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229		88.2			30 - 110					05/29/14 12:48	06/05/14 20:46	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-124407/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125578

Prep Batch: 124407

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total RL	MDC	Unit	%Rec.	Limits
		Result	Qual						
Thorium-230	24.5	24.79		2.53	1.00	0.0955	pCi/g	101	81 - 118
<i>LCS LCS</i>									
Tracer	%Yield	Qualifier	Limits						
Thorium-229	91.1		30 - 110						

Lab Sample ID: 160-6793-36 DU

Client Sample ID: BMAC-GRASS-1

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125623

Prep Batch: 124407

Analyte	Sample		DU		Uncert. (2σ+/-)	Total RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual						
Thorium-228	0.756		0.8387		0.204	1.00	0.0931	pCi/g	0.21	1
Thorium-230	0.994		0.7510		0.190	1.00	0.0684	pCi/g	0.58	1
Thorium-232	0.817		0.8251		0.200	1.00	0.0598	pCi/g	0.02	1
<i>DU DU</i>										
Tracer	%Yield	Qualifier	Limits							
Thorium-229	93.0		30 - 110							

Lab Sample ID: MB 160-124409/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125579

Prep Batch: 124409

Analyte	MB		Count Uncert.	Total Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	(2σ+/-)	(2σ+/-)						
Thorium-228	0.02263	U	0.0354	0.0354	1.00	0.0606	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-230	0.09459		0.0636	0.0641	1.00	0.0568	pCi/g	05/29/14 12:52	06/05/14 20:50	1
Thorium-232	0.008076	U	0.0202	0.0202	1.00	0.0453	pCi/g	05/29/14 12:52	06/05/14 20:50	1
<i>MB MB</i>										
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	93.6		30 - 110					05/29/14 12:52	06/05/14 20:50	1

Lab Sample ID: LCS 160-124409/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125580

Prep Batch: 124409

Analyte	Spike		LCS	LCS	Uncert. (2σ+/-)	Total RL	MDC	Unit	%Rec.	Limits
	Added	Result	Qual	(2σ+/-)						
Thorium-230	24.5	26.11		2.65	1.00	0.117	pCi/g	107	81 - 118	
<i>LCS LCS</i>										
Tracer	%Yield	Qualifier	Limits							
Thorium-229	88.8		30 - 110							

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-56 DU

Matrix: Solid

Analysis Batch: 126088

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)						
Thorium-228	0.531		0.4912		0.164	1.00	0.100	pCi/g		0.12	1
Thorium-230	0.963		0.5893		0.177	1.00	0.0777	pCi/g		0.91	1
Thorium-232	0.432		0.4417		0.152	1.00	0.0795	pCi/g		0.03	1
<b>DU DU</b>											
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>								
Thorium-229	80.6		30 - 110								

Lab Sample ID: MB 160-124410/1-A

Matrix: Solid

Analysis Batch: 125952

Analyte	Sample		DU		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qual	Result	Qual	Uncert. (2σ+/-)							
Thorium-228	0.07630	U	0.0723		0.0726	1.00	0.104	pCi/g		05/29/14 13:01	06/09/14 17:50	1
Thorium-230	0.1805		0.0918		0.0930	1.00	0.0676	pCi/g		05/29/14 13:01	06/09/14 17:50	1
Thorium-232	-0.01475	U	-0.0208		0.0209	1.00	0.0872	pCi/g		05/29/14 13:01	06/09/14 17:50	1
<b>DU DU</b>												
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>								<b>Prepared</b>	<b>Analyzed</b>
Thorium-229	85.9		30 - 110								05/29/14 13:01	06/09/14 17:50

Lab Sample ID: LCS 160-124410/2-A

Matrix: Solid

Analysis Batch: 125955

Analyte	Sample		DU		Total		RL	MDC	Unit	%Rec	Limits
	Spike	Added	Result	Qual	Uncert. (2σ+/-)						
Thorium-230			24.5		25.59	2.62	1.00	0.0656	pCi/g	104	81 - 118
<b>DU DU</b>											
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>								
Thorium-229	89.0		30 - 110								

Lab Sample ID: 160-6793-74 DU

Matrix: Solid

Analysis Batch: 125957

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)						
Thorium-228	0.514		0.5781		0.163	1.00	0.0691	pCi/g		0.19	1
Thorium-230	0.726		0.6286		0.169	1.00	0.0463	pCi/g		0.27	1
Thorium-232	0.653		0.5391		0.155	1.00	0.0461	pCi/g		0.34	1
<b>DU DU</b>											
<b>Tracer</b>	%Yield	Qualifier	<b>Limits</b>								
Thorium-229	94.8		30 - 110								

Client Sample ID: BMAC-SOIL-9

Prep Type: Total/NA

Prep Batch: 124410

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124412/1-A

Matrix: Solid

Analysis Batch: 126687

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124412

Analyte	Result	MB	MB	Count		Total		Prepared	Analyzed	Dil Fac	
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)				
Thorium-228	0.05733	U		0.0514	0.0516	1.00	0.0713	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-230	0.04332	U		0.0389	0.0391	1.00	0.0441	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Thorium-232	0.005853	U		0.0161	0.0161	1.00	0.0378	pCi/g	05/29/14 13:04	06/12/14 16:33	1
Tracer	%Yield	MB	MB						Prepared	Analyzed	Dil Fac
Thorium-229	89.6				30 - 110				05/29/14 13:04	06/12/14 16:33	1

Lab Sample ID: LCS 160-124412/2-A

Matrix: Solid

Analysis Batch: 126688

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124412

Analyte	Spike Added	LCS		LCS		Total		%Rec.	Limits	
		Result	Qual	Result	Qual	Uncert.	(2σ+/-)	RL	MDC	Unit
Thorium-230	24.5	24.70				2.41		1.00	0.0457	pCi/g
Tracer	%Yield	LCS	LCS						101	81 - 118
Thorium-229	94.8				30 - 110					

Lab Sample ID: 160-6793-93 DU

Matrix: Solid

Analysis Batch: 126690

Client Sample ID: BMAC-SOIL-28

Prep Type: Total/NA

Prep Batch: 124412

Analyte	Sample Result	Sample Qual	DU		DU		Total		RER	Limit	
			Result	Qual	Result	Qual	Uncert.	(2σ+/-)	RL	MDC	Unit
Thorium-228	0.622		0.6043		0.163		1.00	0.0972	pCi/g	0.06	1
Thorium-230	0.714		0.6658		0.167		1.00	0.0515	pCi/g	0.14	1
Thorium-232	0.588		0.5241		0.147		1.00	0.0650	pCi/g	0.21	1
Tracer	%Yield	DU	DU								
Thorium-229	76.5				30 - 110						

Lab Sample ID: MB 160-125139/1-A

Matrix: Solid

Analysis Batch: 126450

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 125139

Analyte	Result	MB	MB	Count		Total		Prepared	Analyzed	Dil Fac	
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)	RL	MDC	Unit	
Thorium-228	0.004592	U		0.0221	0.0221	1.00	0.0597	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-230	0.04786	U		0.0574	0.0575	1.00	0.0904	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Thorium-232	-0.002367	U		0.0232	0.0232	1.00	0.0728	pCi/g	06/03/14 09:05	06/11/14 15:44	1
Tracer	%Yield	MB	MB						Prepared	Analyzed	Dil Fac
Thorium-229	91.6				30 - 110				06/03/14 09:05	06/11/14 15:44	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex



## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-125139/2-A

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 125139

Matrix: Solid

Analysis Batch: 126090

Analyte	Spike Added	LCS		LCS		Uncert. (2σ+/-)	Total RL	MDC	Unit	%Rec	%Rec. Limits
		Result	Qual	Result	Qual						
Thorium-230	24.5	23.28				2.42	1.00	0.202	pCi/g	95	81 - 118
<i>LCS LCS</i>											
Tracer	%Yield	Qualifier		Limits							
Thorium-229	87.0			30 - 110							

Lab Sample ID: 160-6793-21 DU

Client Sample ID: KOCH-GRASS-4

Prep Type: Total/NA

Prep Batch: 125139

Matrix: Solid

Analysis Batch: 126108

Analyte	Sample		Sample		DU		DU		Uncert. (2σ+/-)	Total RL	MDC	Unit	RER	Limit	
	Result	Qual	Result	Qual	Result	Qual	Result	Qual							
Thorium-228	0.716				0.7071				0.192	1.00	0.131	pCi/g	0.02	1	
Thorium-230	0.947					1.012			0.228	1.00	0.107	pCi/g	0.15	1	
Thorium-232	0.678					0.6496			0.175	1.00	0.0698	pCi/g	0.08	1	
<i>DU DU</i>															
Tracer	%Yield	Qualifier		Limits											
Thorium-229	91.7			30 - 110											

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-123926/1-A

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 123926

Matrix: Solid

Analysis Batch: 124690

Analyte	MB		MB		Count Uncert. (2σ+/-)	Uncert. (2σ+/-)	Total RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qual	Result	Qual								
Uranium-233/234	0.009145	U			0.0229	0.0229	1.00	0.0512	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-235/236	0.0000	U			0.00525	0.00525	1.00	0.0420	pCi/g	05/27/14 09:22	05/30/14 18:30	1
Uranium-238	0.05617				0.0502	0.0505	1.00	0.0337	pCi/g	05/27/14 09:22	05/30/14 18:30	1
<i>MB MB</i>												
Tracer	%Yield	Qualifier		Limits								
Uranium-232	89.2			30 - 110								
<i>Prepared Analyzed Dil Fac</i>												

Lab Sample ID: LCS 160-123926/2-A

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 123926

Matrix: Solid

Analysis Batch: 124691

Analyte	Spike		LCS		Uncert. (2σ+/-)	Total RL	MDC	Unit	%Rec	%Rec. Limits
	Added	Result	Qual	Result						
Uranium-233/23	6.37	6.983			0.831	1.00	0.0643	pCi/g	110	84 - 120
4										
Uranium-238	6.51	6.764			0.810	1.00	0.0370	pCi/g	104	82 - 122
<i>LCS LCS</i>										
Tracer	%Yield	Qualifier		Limits						
Uranium-232	77.8			30 - 110						

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-1 DU

Client Sample ID: BMAC-DISCRETE-00

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 124679

Prep Batch: 123926

Analyte	Sample		DU		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	Uncert.							
Uranium-233/234	0.722		0.7164		0.198		1.00	0.0697	pCi/g			0.02	1
Uranium-235/236	0.0315	U	0.02765	U	0.0436		1.00	0.0695	pCi/g			0.04	1
Uranium-238	0.704		0.7463		0.201		1.00	0.0367	pCi/g			0.11	1
<i>Tracer</i>	<i>DU</i>	<i>DU</i>											
<i>Tracer</i>	<i>%Yield</i>	<i>Qualifier</i>		<i>Limits</i>									
Uranium-232	77.1		30 - 110										

Lab Sample ID: MB 160-123942/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 124688

Prep Batch: 123942

Analyte	MB		MB		Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	(2σ+/-)	Uncert.	(2σ+/-)	Uncert.								
Uranium-233/234	0.02587	U	0.0374		0.0375		1.00	0.0604	pCi/g	05/27/14 11:23	05/30/14 18:21		1	
Uranium-235/236	0.0000	U	0.00495		0.00495		1.00	0.0396	pCi/g	05/27/14 11:23	05/30/14 18:21		1	
Uranium-238	0.03839	U	0.0427		0.0429		1.00	0.0550	pCi/g	05/27/14 11:23	05/30/14 18:21		1	
<i>Tracer</i>	<i>MB</i>	<i>MB</i>												
<i>Tracer</i>	<i>%Yield</i>	<i>Qualifier</i>		<i>Limits</i>										
Uranium-232	88.0		30 - 110											

Lab Sample ID: LCS 160-123942/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 124689

Prep Batch: 123942

Analyte	Spike		LCS		LCS		Total		RL	MDC	Unit	%Rec	Limits	
	Added	Result	Result	Qual	(2σ+/-)	Uncert.								
Uranium-233/234	6.37		6.803		0.793		1.00	0.0576	pCi/g	107	84 - 120			
Uranium-238	6.51		6.979		0.808		1.00	0.0504	pCi/g	107	82 - 122			
<i>Tracer</i>	<i>LCS</i>	<i>LCS</i>												
<i>Tracer</i>	<i>%Yield</i>	<i>Qualifier</i>		<i>Limits</i>										
Uranium-232	85.0		30 - 110											

Lab Sample ID: 160-6793-21 DU

Client Sample ID: KOCH-GRASS-4

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 124719

Prep Batch: 123942

Analyte	Sample		DU		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	Uncert.							
Uranium-233/234	0.561		0.7159		0.206		1.00	0.0762	pCi/g			0.41	1
Uranium-235/236	0.0118	U	-0.00625	U	0.00886		1.00	0.0866	pCi/g			0.47	1
Uranium-238	0.613		0.4947		0.168		1.00	0.0401	pCi/g			0.34	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.  
Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1



## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: 160-6793-21 DU

Matrix: Solid

Analysis Batch: 124719

Tracer	DU	DU	%Yield	Qualifier	Limits
Uranium-232	72.6				30 - 110

Client Sample ID: KOCH-GRASS-4

Prep Type: Total/NA

Prep Batch: 123942

Lab Sample ID: MB 160-124608/1-A

Matrix: Solid

Analysis Batch: 125572

Analyte	Result	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	Uncert.						
Uranium-233/234	0.02471	U		0.0389	0.0390	1.00	0.0671	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-235/236	-0.002563	U		0.00513	0.00513	1.00	0.0622	pCi/g	05/29/14 12:48	06/05/14 20:41	1
Uranium-238	0.02192	U		0.0310	0.0311	1.00	0.0329	pCi/g	05/29/14 12:48	06/05/14 20:41	1

Tracer	DU	DU	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	86.9				30 - 110	05/29/14 12:48	06/05/14 20:41	1

Lab Sample ID: LCS 160-124608/2-A

Matrix: Solid

Analysis Batch: 125573

Analyte	Spike	LCS	LCS	Total		RL	MDC	Unit	%Rec.	Limits
				Added	Result					
Uranium-233/234	6.37	6.849			0.795	1.00	0.0572	pCi/g	108	84 - 120
Uranium-238	6.51	6.824			0.793	1.00	0.0570	pCi/g	105	82 - 122

Tracer	LCS	LCS	%Yield	Qualifier	Limits
Uranium-232	84.3				30 - 110

Lab Sample ID: 160-6793-36 DU

Matrix: Solid

Analysis Batch: 125619

Analyte	Sample	Sample	DU	DU	Total		RER	Limit
	Result	Qual	Result	Qual	Uncert.	(2σ+/-)		
Uranium-233/234	0.657				0.186	1.00	0.135	pCi/g
Uranium-235/236	0.0107	U			0.0663	1.00	0.0832	pCi/g
Uranium-238	0.652				0.211	1.00	0.112	pCi/g

Tracer	DU	DU	%Yield	Qualifier	Limits
Uranium-232	82.3				30 - 110

Client Sample ID: BMAC-GRASS-1

Prep Type: Total/NA

Prep Batch: 124608

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124609/1-A

Matrix: Solid

Analysis Batch: 125574

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124609

Analyte			Count	Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	MB	MB	Uncert.	(2σ+/-)	Uncert.						
Uranium-233/234	0.03905	U	0.0460	0.0462	1.00	0.0646	pCi/g	05/29/14 12:52	06/05/14 20:44	1	
Uranium-235/236	-0.005301	U	0.00750	0.00751	1.00	0.0734	pCi/g	05/29/14 12:52	06/05/14 20:44	1	
Uranium-238	-0.006377	U	0.00736	0.00738	1.00	0.0645	pCi/g	05/29/14 12:52	06/05/14 20:44	1	
Tracer	MB	MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232	85.4				30 - 110				05/29/14 12:52	06/05/14 20:44	1

Lab Sample ID: LCS 160-124609/2-A

Matrix: Solid

Analysis Batch: 125575

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124609

Analyte			Spike	LCS	LCS	Total		RL	MDC	Unit	%Rec	Limits
	Added	Result	Result	Qual	Uncert.	(2σ+/-)						
Uranium-233/23	6.37	6.605	6.605	U	0.766	1.00	0.0601	pCi/g	104	84 - 120		
Uranium-238	6.51	6.787			0.782	1.00	0.0316	pCi/g	104	82 - 122		
Tracer	LCS	LCS	%Yield	Qualifier	Limits							
Uranium-232	91.9				30 - 110							

Lab Sample ID: 160-6793-56 DU

Matrix: Solid

Analysis Batch: 125603

Client Sample ID: BMAC-GRASS-21

Prep Type: Total/NA

Prep Batch: 124609

Analyte	Sample		DU	DU	Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert.	(2σ+/-)					
Uranium-233/23	0.440		0.4530		0.158	1.00	0.0727	pCi/g		0.04	1
Uranium-235/23	0.0297	U	0.01292	U	0.0324	1.00	0.0724	pCi/g		0.23	1
Uranium-238	0.286		0.4289		0.153	1.00	0.0663	pCi/g		0.52	1
Tracer	DU	DU	%Yield	Qualifier	Limits						
Uranium-232	74.5				30 - 110						

Lab Sample ID: MB 160-124610/1-A

Matrix: Solid

Analysis Batch: 125977

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124610

Analyte	Sample		Count	Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	MB	MB	Uncert.	(2σ+/-)	Uncert.						
Uranium-233/234	0.02862	U	0.0382	0.0383	1.00	0.0566	pCi/g	05/29/14 13:01	06/09/14 17:53	1	
Uranium-235/236	0.00000	U	0.00509	0.00509	1.00	0.0407	pCi/g	05/29/14 13:01	06/09/14 17:53	1	
Uranium-238	0.01564	U	0.0316	0.0316	1.00	0.0619	pCi/g	05/29/14 13:01	06/09/14 17:53	1	

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: MB 160-124610/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125977

Prep Batch: 124610

Tracer	MB	MB	%Yield	Qualifier	Limits
Uranium-232			82.9		30 - 110

Prepared      Analyzed      Dil Fac  
05/29/14 13:01    06/09/14 17:53    1

Lab Sample ID: LCS 160-124610/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125978

Prep Batch: 124610

Analyte	Spike		LCS		Total		RL	MDC	Unit	%Rec.	Limits	
	Added	Result	Result	Qual	Uncert. (2σ+/-)							
Uranium-233/23		6.37	6.020		0.739		1.00	0.0625	pCi/g	95	84 - 120	
4												
Uranium-238		6.51	7.002		0.826		1.00	0.0683	pCi/g	108	82 - 122	
Tracer	LCS		LCS									
	%Yield	Qualifier		Limits								
Uranium-232		76.8		30 - 110								

Lab Sample ID: 160-6793-74 DU

Client Sample ID: BMAC-SOIL-9

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 125980

Prep Batch: 124610

Analyte	Sample		Sample		DU		DU		Uncert.		RER	Limit	
	Result	Qual			Result	Qual	(2σ+/-)		RL	MDC	Unit		
Uranium-233/23	0.370				0.3984		0.140		1.00	0.0755	pCi/g	0.1	1
4													
Uranium-235/23	0.0174	U			0.02246	U	0.0398		1.00	0.0718	pCi/g	0.07	1
6													
Uranium-238	0.467				0.3595		0.131		1.00	0.0630	pCi/g	0.36	1
Tracer	DU		DU										
	%Yield	Qualifier		Limits									
Uranium-232		82.7		30 - 110									

Lab Sample ID: MB 160-124634/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 126682

Prep Batch: 124634

Analyte	Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	MB	MB	Uncert.	Uncert.						
Uranium-233/234	0.01282	U	0.0578	0.0578	1.00	0.122	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-235/236	0.02252	U	0.0544	0.0544	1.00	0.111	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Uranium-238	0.0000	U	0.0454	0.0454	1.00	0.111	pCi/g	05/29/14 13:04	06/12/14 16:31	1
Tracer	MB		MB							
	%Yield	Qualifier		Limits						
Uranium-232		79.7		30 - 110						

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-124634/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 126683

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		%Rec.	Limits
		Result	Qual		RL	MDC		
Uranium-233/234	6.37	5.723		0.711	1.00	0.0912	pCi/g	90 84 - 120
Uranium-238	6.51	5.849		0.722	1.00	0.0969	pCi/g	90 82 - 122
<i>Tracer</i>		LCS	LCS					
<i>Uranium-232</i>	81.5	%Yield	Qualifier	Limits				
				30 - 110				

Lab Sample ID: 160-6793-93 DU

Client Sample ID: BMAC-SOIL-28

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 126712

Analyte	Sample		DU		Uncert. (2σ+/-)	Total		RER	Limit
	Result	Qual	Result	Qual		RL	MDC		
Uranium-233/234	0.392		0.4040		0.145	1.00	0.0910	pCi/g	0.04 1
Uranium-235/236	0.0379	U	-0.00268	U	0.00537	1.00	0.0652	pCi/g	0.67 1
Uranium-238	0.618		0.4390		0.148	1.00	0.0701	pCi/g	0.53 1
<i>Tracer</i>		DU	DU						
<i>Uranium-232</i>	83.7	%Yield	Qualifier	Limits					
				30 - 110					

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-124211/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 127604

Analyte	MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier								
Actinium-227	0.03407	U	0.187	0.187		0.362	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Actinium-228	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-212	0.1071	U	0.274	0.274		0.512	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Bismuth-214	0.03604	U	0.101	0.101		0.183	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-210	0.8395	U	1.15	1.15		1.90	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-212	-0.006678	U	0.0731	0.0731		0.118	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Lead-214	0.06813	U	0.0742	0.0746		0.147	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Potassium-40	0.1688	U	0.428	0.429		0.918	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Protactinium-231	0.08175	U	0.554	0.554		1.61	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-226	0.03604	U	0.101	0.101	1.00	0.183	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Radium-228	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-232	0.009706	U	0.0191	0.0191		0.289	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thorium-234	-0.2462	U	1.39	1.39		1.55	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Thallium-208	0.009690	U	0.0352	0.0352		0.0722	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-235	0.1504	U	0.144	0.145		0.207	pCi/g	05/28/14 15:58	06/19/14 02:23	1
Uranium-238	-0.2462	U	1.39	1.39		1.55	pCi/g	05/28/14 15:58	06/19/14 02:23	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124211/1-A

Matrix: Solid

Analysis Batch: 127604

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124211

Other Detected Radionuclides	MB Result	MB Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Other Detected Radionuclide	None						pCi/g	05/28/14 15:58	06/19/14 02:23	1

Lab Sample ID: LCS 160-124211/2-A

Matrix: Solid

Analysis Batch: 127685

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124211

Analyte	Spike Added	LCS Result	LCS Qual	Total		RL	MDC	Unit	%Rec	Limits
				Uncert. (2σ+/-)	%Rec.					
Americium-241	97.4	99.57		10.5			1.14	pCi/g	102	87 - 116
Cesium-137	31.0	31.60		3.37			0.280	pCi/g	102	87 - 120
Cobalt-60	22.2	21.97		2.27			0.112	pCi/g	99	87 - 115

Lab Sample ID: 160-6793-1 DU

Client Sample ID: BMAC-DISCRETE-00

Matrix: Solid

Analysis Batch: 127684

Prep Type: Total/NA

Prep Batch: 124211

Analyte	Sample Result	Sample Qual	DU		Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
			DU Result	DU Qual						
Actinium-227	-0.855	U	0.02371	U	0.0473		0.686	pCi/g	1.00	1
Actinium 228	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Bismuth-212	0.643	U	0.4925	U	0.696		1.16	pCi/g	0.09	1
Bismuth-214	1.08		1.326		0.269		0.160	pCi/g	0.44	1
Lead-210	0.387	U	1.912	U	1.98		3.21	pCi/g	0.37	1
Lead-212	1.08		1.255		0.241		0.175	pCi/g	0.36	1
Lead-214	1.34		1.288		0.237		0.187	pCi/g	0.10	1
Potassium-40	19.8		17.36		2.90		0.834	pCi/g	0.39	1
Protactinium-231	0.589	U	0.4610	U	0.746		2.70	pCi/g	0.09	1
Radium-226	1.08		1.326		0.269	1.00	0.160	pCi/g	0.44	1
Radium-228	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Thorium-232	1.62		1.348		0.346		0.133	pCi/g	0.38	1
Thorium-234	1.07	U	1.222	U	1.73		3.00	pCi/g	0.04	1
Thallium-208	0.348		0.4963		0.112		0.0488	pCi/g	0.67	1
Uranium-235	0.0282	U	0.2328	U	0.319		0.547	pCi/g	0.52	1
Uranium-238	1.07	U	1.222	U	1.73		3.00	pCi/g	0.04	1

Lab Sample ID: MB 160-124219/1-A

Client Sample ID: Method Blank

Matrix: Solid

Analysis Batch: 127689

Prep Type: Total/NA

Prep Batch: 124219

Analyte	Count		Uncert. (2σ+/-)	Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	MB Result	MB Qualifier								
Actinium-227	-0.09167	U	0.274	0.274		0.492	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Actinium 228	0.0000	U	0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Bismuth-212	0.0000	U	0.218	0.218		1.65	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Bismuth-214	0.09328	U	0.127	0.127		0.276	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Lead-210	-0.5092	U	2.30	2.30		2.76	pCi/g	05/28/14 16:56	06/19/14 17:42	1
Lead-212	-0.05669	U	4.32	4.32		0.186	pCi/g	05/28/14 16:56	06/19/14 17:42	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124219/1-A

Matrix: Solid

Analysis Batch: 127689

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124219

Analyte	Result	MB	MB	Count		Total		Prepared	Analyzed	Dil Fac			
				Qualifier	(2σ+/-)	Uncert.	(2σ+/-)						
Lead-214	0.02792	U			0.105	0.105		0.202	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Potassium-40	0.00000	U			0.397	0.397		1.04	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Protactinium-231	0.1373	U			0.307	0.308		3.04	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Radium-226	0.09328	U			0.127	0.127	1.00	0.276	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Radium-228	0.00000	U			0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Thorium-232	0.00000	U			0.0688	0.0688		0.253	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Thorium-234	0.1444	U			0.931	0.931		1.94	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Thallium-208	0.03117	U			0.0856	0.0857		0.150	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Uranium-235	0.07560	U			0.251	0.251		0.445	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
Uranium-238	0.1444	U			0.931	0.931		1.94	pCi/g	05/28/14 16:56	06/19/14 17:42	1	
<i>Other Detected</i>				<i>Count</i>		<i>Total</i>							
<i>Radionuclides</i>	<i>Result</i>	<i>MB</i>	<i>MB</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>Uncert.</i>	<i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Other Detected</i>	<i>None</i>									<i>pCi/g</i>	<i>05/28/14 16:56</i>	<i>06/19/14 17:42</i>	<i>1</i>
<i>Radionuclide</i>													

Lab Sample ID: LCS 160-124219/2-A

Matrix: Solid

Analysis Batch: 127687

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124219

Analyte	Spike Added	LCS Result	LCS Qual	Total		Uncert. (2σ+/-)	RL	MDC	Unit	%Rec.	Limits
				Result	Uncert. (2σ+/-)						
Americium-241	97.4	97.03		10.2				1.03	pCi/g	100	87 - 116
Cesium-137	31.0	30.24		3.22				0.262	pCi/g	97	87 - 120
Cobalt-60	22.2	20.87		2.15				0.158	pCi/g	94	87 - 115

Lab Sample ID: 160-6793-21 DU

Matrix: Solid

Analysis Batch: 127687

Client Sample ID: KOCH-GRASS-4

Prep Type: Total/NA

Prep Batch: 124219

Analyte	Sample Result	Sample Qual	DU		DU Result	DU Qual	Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
			Result	Qual								
Actinium-227	0.0458	U			0.04671	U	0.112		1.81	pCi/g	0	1
Actinium-228	0.716	U			1.194		0.332		0.146	pCi/g	0.63	1
Bismuth-212	0.879	U			0.5567	U	0.833		1.39	pCi/g	0.14	1
Bismuth-214	1.32				1.315		0.255		0.0897	pCi/g	0.01	1
Lead-210	4.12				2.777		1.85		2.61	pCi/g	0.29	1
Lead-212	1.23				1.260		0.229		0.136	pCi/g	0.05	1
Lead-214	1.50				1.261		0.220		0.150	pCi/g	0.41	1
Potassium-40	17.3				15.99		2.82		0.607	pCi/g	0.20	1
Protactinium-231	1.49	U			0.4631	U	0.766		2.06	pCi/g	0.41	1
Radium-226	1.32				1.315		0.255	1.00	0.0897	pCi/g	0.01	1
Radium-228	0.716	U			1.194		0.332		0.146	pCi/g	0.63	1
Thorium-232	0.716	U			1.194		0.332		0.146	pCi/g	0.63	1
Thorium-234	1.71	U			1.072	U	0.721		2.26	pCi/g	0.33	1
Thallium-208	0.273				0.3355		0.108		0.0812	pCi/g	0.22	1
Uranium-235	0.424	U			0.2441	U	0.319		0.482	pCi/g	0.23	1
Uranium-238	1.71	U			1.072	U	0.721		2.26	pCi/g	0.33	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124397/1-A

Matrix: Solid

Analysis Batch: 127763

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124397

Analyte	Result	MB	MB	Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)						
Actinium-227	-0.1652	U		0.291		0.292			0.490	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Actinium 228	0.0000	U		0.114		0.114			0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-212	0.1225	U		0.363		0.363			0.674	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Bismuth-214	-0.03283	U		0.232		0.232			0.212	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-210	0.1484	U		0.821		0.821			1.78	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-212	0.04426	U		0.0657		0.0659			0.121	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Lead-214	0.009964	U		0.0507		0.0507			0.119	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Potassium-40	0.03188	U		0.595		0.595			1.30	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Protactinium-231	0.02120	U		0.0642		0.0643			1.64	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-226	-0.03283	U		0.232		0.232	1.00		0.212	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Radium-228	0.00000	U		0.114		0.114			0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-232	0.00000	U		0.114		0.114			0.347	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thorium-234	-0.3098	U		1.27		1.27			1.37	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Thallium-208	-0.02284	U		0.113		0.113			0.0830	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-235	0.07424	U		0.168		0.168			0.230	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Uranium-238	-0.3098	U		1.27		1.27			1.37	pCi/g	05/29/14 11:21	06/20/14 15:28	1
Other Detected	Radionuclides	MB	MB	Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac
				Result	Qualifier	(2σ+/-)	(2σ+/-)						
Other Detected	None									pCi/g	05/29/14 11:21	06/20/14 15:28	1
	Radionuclide												

Lab Sample ID: LCS 160-124397/2-A

Matrix: Solid

Analysis Batch: 127765

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124397

Analyte	Spike	Added	LCS		Total		RL	MDC	Unit	%Rec	Limits
			Result	Qual	(2σ+/-)	(2σ+/-)					
Americium-241		97.4	99.44		10.4			1.21	pCi/g	102	87 - 116
Cesium-137		31.0	30.65		3.26			0.273	pCi/g	99	87 - 120
Cobalt-60		22.2	21.79		2.24			0.199	pCi/g	98	87 - 115

Lab Sample ID: 160-6793-36 DU

Matrix: Solid

Analysis Batch: 127767

Client Sample ID: BMAC-GRASS-1

Prep Type: Total/NA

Prep Batch: 124397

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	(2σ+/-)					
Actinium-227	-0.557	U	-0.03065	U	1.15			1.95	pCi/g	0.31	1
Actinium 228	1.18		1.239		0.352			0.297	pCi/g	0.08	1
Bismuth-212	-0.0296	U	0.9418	U	1.03			1.65	pCi/g	0.55	1
Bismuth-214	1.16		1.036		0.288			0.226	pCi/g	0.22	1
Lead-210	1.83	U	2.494	U	2.52			3.39	pCi/g	0.16	1
Lead-212	1.25		1.023		0.237			0.230	pCi/g	0.46	1
Lead-214	1.43		1.402		0.309			0.231	pCi/g	0.05	1
Potassium-40	19.1		18.96		3.39			1.12	pCi/g	0.02	1
Protactinium-231	0.810	U	0.2167	U	0.335			3.61	pCi/g	0.62	1
Radium-226	1.16		1.036		0.288	1.00		0.226	pCi/g	0.22	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-6793-36 DU

Matrix: Solid

Analysis Batch: 127767

Client Sample ID: BMAC-GRASS-1

Prep Type: Total/NA

Prep Batch: 124397

Analyte	Sample	Sample	DU		DU		Total		RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	Uncert.	RER	Limit					
Radium-228	1.18		1.239		0.352		0.297	pCi/g		0.08		1	
Thorium-232	1.18		1.239		0.352		0.297	pCi/g		0.08		1	
Thorium-234	1.27	U	0.6006	U	1.50		2.66	pCi/g		0.24		1	
Thallium-208	0.315		0.4717		0.116		0.0423	pCi/g		0.70		1	
Uranium-235	0.222	U	0.1376	U	0.364		0.710	pCi/g		0.12		1	
Uranium-238	1.27	U	0.6006	U	1.50		2.66	pCi/g		0.24		1	

Lab Sample ID: MB 160-124411/1-A

Matrix: Solid

Analysis Batch: 127759

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124411

Analyte	MB		MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
	Result	Qualifier	(2σ+/-)	Uncert.	Uncert.							
Actinium-227	0.01693	U	0.0309	0.0309	0.0309		0.742	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Actinium 228	0.03063	U	0.0881	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Bismuth-212	-0.1930	U	1.06	1.06	1.06		1.98	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Bismuth-214	-0.0007463	U	0.155	0.155	0.155		0.309	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Lead-210	-0.5850	U	2.73	2.73	2.73		2.89	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Lead-212	0.1307	U	0.0962	0.0976	0.0976		0.143	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Lead-214	0.02054	U	0.0982	0.0983	0.0983		0.183	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Potassium-40	0.0000	U	0.281	0.281	0.281		1.04	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Protactinium-231	0.2553	U	0.715	0.716	0.716		2.41	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Radium-226	-0.0007463	U	0.155	0.155	1.00		0.309	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Radium-228	0.03063	U	0.0881	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Thorium-232	0.03063	U	0.0881	0.0881	0.0881		0.573	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Thorium-234	-0.6089	U	3.96	3.96	3.96		2.08	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Thallium-208	-0.01260	U	0.0787	0.0787	0.0787		0.150	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Uranium-235	0.1211	U	0.229	0.230	0.230		0.403	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Uranium-238	-0.6089	U	3.96	3.96	3.96		2.08	pCi/g	05/29/14 13:01	06/20/14 16:18	1	
Other Detected	MB	MB	Count	Total								
Radionuclides	Result	Qualifier	Uncert.	Uncert.								
Other Detected Radionuclide	None		(2σ+/-)	(2σ+/-)			RL	MDC	Unit	Prepared	Analyzed	Dil Fac
									pCi/g	05/29/14 13:01	06/20/14 16:18	1

Lab Sample ID: LCS 160-124411/2-A

Matrix: Solid

Analysis Batch: 127760

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124411

Analyte	Spike		LCS	LCS	Uncert.	RL	MDC	Unit	%Rec.	Limits
	Added	Result	Qual	(2σ+/-)						
Américium-241	97.4	96.78		10.1			1.04	pCi/g	99	87 - 116
Cesium-137	31.0	29.43		3.14			0.276	pCi/g	95	87 - 120
Cobalt-60	22.2	20.73		2.14			0.0407	pCi/g	93	87 - 115

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-6793-56 DU

Matrix: Solid

Analysis Batch: 127760

Client Sample ID: BMAC-GRASS-21

Prep Type: Total/NA

Prep Batch: 124411

Analyte	Sample		DU		Total		RL	MDC	Unit	RER	Limit	
	Result	Qual	Result	Qual	Uncert. (2σ+/-)							
Actinium-227	0.0318	U	0.07983	U	0.241			0.789	pCi/g		0.16	1
Actinium 228	0.618		0.5420		0.213			0.259	pCi/g		0.18	1
Bismuth-212	0.148	U		1.175	0.410			0.240	pCi/g		1.09	1
Bismuth-214	0.551		0.5335		0.128			0.0902	pCi/g		0.07	1
Lead-210	1.06	U	0.4512	U	0.873			1.54	pCi/g		0.32	1
Lead-212	0.454		0.4540		0.0957			0.0777	pCi/g	0	1	
Lead-214	0.570		0.6155		0.119			0.0904	pCi/g		0.19	1
Potassium-40	16.3		13.97		2.15			0.789	pCi/g		0.49	1
Protactinium-231	0.320	U	0.2867	U	0.253			1.56	pCi/g		0.05	1
Radium-226	0.551		0.5335		0.128	1.00		0.0902	pCi/g		0.07	1
Radium-228	0.618		0.5420		0.213			0.259	pCi/g		0.18	1
Thorium-232	0.618		0.5420		0.213			0.259	pCi/g		0.18	1
Thorium-234	0.640	U	0.8498	U	0.429			1.10	pCi/g		0.16	1
Thallium-208	0.205		0.2099		0.0586			0.0381	pCi/g		0.04	1
Uranium-235	0.0411	U	0.09891	U	0.136			0.298	pCi/g		0.26	1
Uranium-238	0.640	U	0.8498	U	0.429			1.10	pCi/g		0.16	1

Lab Sample ID: MB 160-124413/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 127759

Prep Batch: 124413

Analyte	MB		MB		Count		Total		RL	MDC	Unit	Prepared	Analyzed	Dil Fac	
	Result	Qualifier	(2σ+/-)	Uncert.	(2σ+/-)	Uncert.									
Actinium-227	0.01589	U		0.149	0.149				0.633	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Actinium 228	0.03304	U		0.189	0.189				0.384	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Bismuth-212	0.0000	U		0.308	0.308				0.804	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Bismuth-214	0.06079	U		0.114	0.114				0.231	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Lead-210	0.8122	U		1.09	1.09				2.25	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Lead-212	0.02107	U		0.0937	0.0937				0.184	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Lead-214	0.03859	U		0.0763	0.0764				0.129	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Potassium-40	0.0000	U		0.281	0.281				1.04	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Protactinium-231	0.04885	U		0.0871	0.0872				2.74	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Radium-226	0.06079	U		0.114	0.114	1.00			0.231	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Radium-228	0.03304	U		0.189	0.189				0.384	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Thorium-232	0.03304	U		0.189	0.189				0.384	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Thorium-234	-0.3979	U		2.27	2.27				2.09	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Thallium-208	0.02024	U		0.0776	0.0777				0.143	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Uranium-235	0.2037	U		0.219	0.220				0.347	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Uranium-238	-0.3979	U		2.27	2.27				2.09	pCi/g		05/29/14 13:06	06/20/14 11:51	1	
Other Detected	MB	MB	Uncert.	Uncert.	Count	Total									
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac					
Other Detected	None						pCi/g	05/29/14 13:06	06/20/14 11:51	1					
Radionuclide															

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-124413/2-A

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124413

Matrix: Solid

Analysis Batch: 127764

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total			%Rec.	Limits
		Result	Qual		RL	MDC	Unit		
Americium-241	97.4	98.29		10.3		0.773	pCi/g	101	87 - 116
Cesium-137	31.0	30.07		3.19		0.245	pCi/g	97	87 - 120
Cobalt-60	22.2	21.17		2.17		0.0834	pCi/g	95	87 - 115

Lab Sample ID: 160-6793-80 DU

Client Sample ID: BMAC-SOIL-15

Prep Type: Total/NA

Prep Batch: 124413

Matrix: Solid

Analysis Batch: 127764

Analyte	Sample		DU		Uncert. (2σ+/-)	Total			RER	Limit
	Result	Qual	Result	Qual		RL	MDC	Unit		
Actinium-227	-0.634	U			-0.2059	U	0.386	pCi/g	0.43	1
Actinium-228	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Bismuth-212	0.591	U	0.8966	U	0.665		0.962	pCi/g	0.21	1
Bismuth-214	1.28		0.8138		0.211		0.177	pCi/g	0.99	1
Lead-210	3.04		1.852	U	1.48		2.31	pCi/g	0.37	1
Lead-212	1.11		1.005		0.199		0.146	pCi/g	0.25	1
Lead-214	1.28		0.9518		0.239		0.195	pCi/g	0.66	1
Potassium-40	14.1		14.58		2.45		1.01	pCi/g	0.10	1
Protactinium-231	0.497	U	-0.4455	U	1.50		2.60	pCi/g	0.39	1
Radium-226	1.28		0.8138		0.211	1.00	0.177	pCi/g	0.99	1
Radium-228	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Thorium-232	1.35		1.223		0.280		0.184	pCi/g	0.22	1
Thorium-234	1.21	U	1.303	U	0.660		2.37	pCi/g	0.05	1
Thallium-208	0.416		0.3236		0.0909		0.0614	pCi/g	0.47	1
Uranium-235	0.195	U	0.05372	U	0.314		0.543	pCi/g	0.24	1
Uranium-238	1.21	U	1.303	U	0.660		2.37	pCi/g	0.05	1

Lab Sample ID: MB 160-124414/1-A

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124414

Matrix: Solid

Analysis Batch: 127764

Analyte	MB		Qualifier	Count (2σ+/-)	Total (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB									
Actinium-227	-0.09024	U		0.220	0.220		0.377	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Actinium-228	0.03525	U		0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Bismuth-212	0.00000	U		0.0810	0.0810		0.869	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Bismuth-214	0.06998	U		0.0833	0.0837		0.149	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-210	0.006491	U		0.628	0.628		1.16	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-212	0.04331	U		0.0519	0.0522		0.0884	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Lead-214	0.09200			0.0577	0.0585		0.0865	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Potassium-40	-0.07715	U		0.603	0.603		0.986	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Protactinium-231	-0.02323	U		0.0547	0.0548		1.25	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Radium-226	0.06998	U		0.0833	0.0837	1.00	0.149	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Radium-228	0.03525	U		0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thorium-232	0.03525	U		0.0994	0.0994		0.182	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thorium-234	0.03628	U		0.467	0.467		0.855	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Thallium-208	0.02674	U		0.0450	0.0451		0.0505	pCi/g	05/29/14 13:09	06/20/14 01:34	1

TestAmerica St. Louis

# QC Sample Results

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-124414/1-A

Matrix: Solid

Analysis Batch: 127764

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 124414

Analyte	Result	MB MB Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235	0.01201	U	0.0325	0.0326		0.238	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Uranium-238	0.03628	U	0.467	0.467		0.855	pCi/g	05/29/14 13:09	06/20/14 01:34	1
Other Detected			Count	Total						
Radionuclides			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Other Detected		None					pCi/g	05/29/14 13:09	06/20/14 01:34	1
Radionuclide										

Lab Sample ID: LCS 160-124414/2-A

Matrix: Solid

Analysis Batch: 127762

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 124414

Analyte	Added	Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	Limits
		Result	Qual	Uncert. (2σ+/-)						
Americium-241	97.4		99.64		10.5		1.19	pCi/g	102	87 - 116
Cesium-137	31.0		31.40		3.35		0.254	pCi/g	101	87 - 120
Cobalt-60	22.2		22.31		2.29		0.125	pCi/g	100	87 - 115

Lab Sample ID: 160-6793-100 DU

Matrix: Solid

Analysis Batch: 127764

Client Sample ID: BMAC-OUTFALL-6

Prep Type: Total/NA

Prep Batch: 124414

Analyte	Sample	Sample	DU	DU	Total	RL	MDC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Actinium-227	-0.606	U	0.2099	U	0.173		0.264	pCi/g	1.06	1
Actinium-228	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Bismuth-212	1.57		0.5768	U	0.585		0.930	pCi/g	0.72	1
Bismuth-214	0.728		0.9516		0.209		0.143	pCi/g	0.59	1
Lead-210	2.91		1.300	U	1.43		2.33	pCi/g	0.51	1
Lead-212	0.963		0.8909		0.166		0.114	pCi/g	0.20	1
Lead-214	1.12		0.9072		0.156		0.100	pCi/g	0.57	1
Potassium-40	15.5		18.27		2.62		0.724	pCi/g	0.53	1
Protactinium-231	0.728	U	0.4299	U	0.587		1.99	pCi/g	0.25	1
Radium-226	0.728		0.9516		0.209	1.00	0.143	pCi/g	0.59	1
Radium-228	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Thorium-232	1.26		0.6869		0.219		0.236	pCi/g	1.04	1
Thorium-234	2.10		1.264	U	0.601		1.34	pCi/g	0.39	1
Thallium-208	0.287		0.2956		0.0710		0.0355	pCi/g	0.05	1
Uranium-235	0.236	U	0.08139	U	0.286		0.356	pCi/g	0.26	1
Uranium-238	2.10		1.264	U	0.601		1.34	pCi/g	0.39	1

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad

### Leach Batch: 123686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	Dry and Grind	
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	Dry and Grind	
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	Dry and Grind	
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	Dry and Grind	
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	Dry and Grind	
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	Dry and Grind	
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	Dry and Grind	
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	Dry and Grind	
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	Dry and Grind	
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	Dry and Grind	
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	Dry and Grind	
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	Dry and Grind	
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	Dry and Grind	
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	Dry and Grind	

### Prep Batch: 123904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	ExtChrom	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	ExtChrom	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	ExtChrom	123686
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	ExtChrom	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	ExtChrom	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	ExtChrom	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	ExtChrom	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	ExtChrom	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	ExtChrom	123686

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 123904 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	ExtChrom	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	ExtChrom	123686
LCS 160-123904/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123904/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 123926

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	ExtChrom	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	ExtChrom	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	ExtChrom	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	ExtChrom	123686
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	ExtChrom	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	ExtChrom	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	ExtChrom	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	ExtChrom	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	ExtChrom	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	ExtChrom	123686
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	ExtChrom	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	ExtChrom	123686
LCS 160-123926/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123926/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Leach Batch: 123927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	Dry and Grind	
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	Dry and Grind	
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	Dry and Grind	
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	Dry and Grind	
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	Dry and Grind	
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	Dry and Grind	
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	Dry and Grind	
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	Dry and Grind	
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	Dry and Grind	

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Leach Batch: 123927 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	Dry and Grind	
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	Dry and Grind	
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	Dry and Grind	
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	Dry and Grind	
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	Dry and Grind	
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	Dry and Grind	
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	Dry and Grind	
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	Dry and Grind	
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	Dry and Grind	
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	Dry and Grind	
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	Dry and Grind	
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	Dry and Grind	
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	Dry and Grind	
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	Dry and Grind	
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	Dry and Grind	
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	Dry and Grind	
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	Dry and Grind	
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	Dry and Grind	
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	Dry and Grind	
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	Dry and Grind	
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	Dry and Grind	
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	Dry and Grind	
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	Dry and Grind	
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	Dry and Grind	
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	Dry and Grind	
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	Dry and Grind	
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	Dry and Grind	
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	Dry and Grind	
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	Dry and Grind	
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	Dry and Grind	
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	Dry and Grind	
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	Dry and Grind	
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	Dry and Grind	
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	Dry and Grind	
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	Dry and Grind	
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	Dry and Grind	
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	Dry and Grind	
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	Dry and Grind	
160-6793-80 DU	BMAC-SOIL-15	Total/NA	Solid	Dry and Grind	
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	Dry and Grind	
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	Dry and Grind	
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	Dry and Grind	
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	Dry and Grind	
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	Dry and Grind	
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	Dry and Grind	
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	Dry and Grind	
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	Dry and Grind	
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	Dry and Grind	
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	Dry and Grind	
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	Dry and Grind	
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	Dry and Grind	

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Leach Batch: 123927 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	Dry and Grind	
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	Dry and Grind	
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	Dry and Grind	
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	Dry and Grind	
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	Dry and Grind	
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	Dry and Grind	
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	Dry and Grind	
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	Dry and Grind	
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	Dry and Grind	
160-6793-100 DU	BMAC-OUTFALL-6	Total/NA	Solid	Dry and Grind	
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	Dry and Grind	
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	Dry and Grind	
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	Dry and Grind	
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	Dry and Grind	
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	Dry and Grind	
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	Dry and Grind	
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	Dry and Grind	
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	Dry and Grind	
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	Dry and Grind	
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	Dry and Grind	
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	Dry and Grind	
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	Dry and Grind	

### Prep Batch: 123942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	ExtChrom	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	ExtChrom	123686
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	ExtChrom	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	ExtChrom	123686
LCS 160-123942/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-123942/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 124211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-1	BMAC-DISCRETE-00	Total/NA	Solid	Fill_Geo-21	123686
160-6793-1 DU	BMAC-DISCRETE-00	Total/NA	Solid	Fill_Geo-21	123686
160-6793-2	BMAC-DISCRETE-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-3	BMAC-DISCRETE-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-4	BMAC-DISCRETE-3	Total/NA	Solid	Fill_Geo-21	123686

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124211 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-5	BMAC-DISCRETE-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-6	BMAC-DISCRETE-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-7	BMAC-DISCRETE-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-8	BMAC-DISCRETE-7	Total/NA	Solid	Fill_Geo-21	123686
160-6793-9	BMAC-DISCRETE-8	Total/NA	Solid	Fill_Geo-21	123686
160-6793-10	BMAC-DISCRETE-9	Total/NA	Solid	Fill_Geo-21	123686
160-6793-11	BMAC-DISCRETE-10	Total/NA	Solid	Fill_Geo-21	123686
160-6793-12	KOCH-SOIL-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-13	KOCH-SOIL-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-14	KOCH-SOIL-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-15	KOCH-SOIL-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-16	KOCH-SOIL-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-17	KOCH-SOIL-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-18	KOCH-GRASS-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-19	KOCH-GRASS-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-20	KOCH-GRASS-3	Total/NA	Solid	Fill_Geo-21	123686
LCS 160-124211/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	123686
MB 160-124211/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	123686

### Prep Batch: 124219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	Fill_Geo-21	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	Fill_Geo-21	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	Fill_Geo-21	123686
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	Fill_Geo-21	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	Fill_Geo-21	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	Fill_Geo-21	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	Fill_Geo-21	123686
LCS 160-124219/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	123686
MB 160-124219/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	123686

### Prep Batch: 124397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	Fill_Geo-21	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	Fill_Geo-21	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124397 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	Fill_Geo-21	123927
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	Fill_Geo-21	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	Fill_Geo-21	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124397/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	123927
MB 160-124397/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 124407

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	ExtChrom	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	ExtChrom	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	ExtChrom	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	ExtChrom	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	ExtChrom	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	ExtChrom	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	ExtChrom	123927
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	ExtChrom	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	ExtChrom	123927
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	ExtChrom	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	ExtChrom	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	ExtChrom	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	ExtChrom	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	ExtChrom	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	ExtChrom	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	ExtChrom	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	ExtChrom	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	ExtChrom	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124407/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124407/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 124409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	ExtChrom	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	ExtChrom	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	ExtChrom	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	ExtChrom	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	ExtChrom	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	ExtChrom	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124409 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	ExtChrom	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	ExtChrom	123927
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	ExtChrom	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	ExtChrom	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	ExtChrom	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	ExtChrom	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	ExtChrom	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	ExtChrom	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	ExtChrom	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	ExtChrom	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	ExtChrom	123927
LCS 160-124409/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	123927
MB 160-124409/1-A	Method Blank	Total/NA	Solid	ExtChrom	123927

### Prep Batch: 124410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	ExtChrom	123927
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	ExtChrom	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	ExtChrom	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	ExtChrom	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	ExtChrom	123927
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	ExtChrom	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	ExtChrom	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	ExtChrom	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	ExtChrom	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	ExtChrom	123927
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	ExtChrom	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	ExtChrom	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	ExtChrom	123927
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	ExtChrom	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	ExtChrom	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	ExtChrom	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	ExtChrom	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	ExtChrom	123927
LCS 160-124410/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	123927
MB 160-124410/1-A	Method Blank	Total/NA	Solid	ExtChrom	123927

### Prep Batch: 124411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	Fill_Geo-21	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	Fill_Geo-21	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	Fill_Geo-21	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	Fill_Geo-21	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	Fill_Geo-21	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	Fill_Geo-21	123927
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	Fill_Geo-21	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	Fill_Geo-21	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Rad (Continued)

### Prep Batch: 124411 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	Fill_Geo-21	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	Fill_Geo-21	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	Fill_Geo-21	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	Fill_Geo-21	123927
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124411/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	123927
MB 160-124411/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	123927

### Prep Batch: 124412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	ExtChrom	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	ExtChrom	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	ExtChrom	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	ExtChrom	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	ExtChrom	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	ExtChrom	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	ExtChrom	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	ExtChrom	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	ExtChrom	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	ExtChrom	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	ExtChrom	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	ExtChrom	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	ExtChrom	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	ExtChrom	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	ExtChrom	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	ExtChrom	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	ExtChrom	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	ExtChrom	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124412/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	123927
MB 160-124412/1-A	Method Blank	Total/NA	Solid	ExtChrom	123927

### Prep Batch: 124413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-80 DU	BMAC-SOIL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	Fill_Geo-21	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	Fill_Geo-21	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	Fill_Geo-21	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124413 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	Fill_Geo-21	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	Fill_Geo-21	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	Fill_Geo-21	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	Fill_Geo-21	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	Fill_Geo-21	123927
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	Fill_Geo-21	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	Fill_Geo-21	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	Fill_Geo-21	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	Fill_Geo-21	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	Fill_Geo-21	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	Fill_Geo-21	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124413/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	123927
MB 160-124413/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 124414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	Fill_Geo-21	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	Fill_Geo-21	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-100 DU	BMAC-OUTFALL-6	Total/NA	Solid	Fill_Geo-21	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	Fill_Geo-21	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	Fill_Geo-21	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	Fill_Geo-21	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	Fill_Geo-21	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	Fill_Geo-21	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	Fill_Geo-21	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	Fill_Geo-21	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	Fill_Geo-21	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	Fill_Geo-21	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	Fill_Geo-21	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	Fill_Geo-21	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	Fill_Geo-21	123927
LCS 160-124414/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-124414/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 124608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-36	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-36 DU	BMAC-GRASS-1	Total/NA	Solid	ExtChrom	123927
160-6793-37	BMAC-GRASS-2	Total/NA	Solid	ExtChrom	123927
160-6793-38	BMAC-GRASS-3	Total/NA	Solid	ExtChrom	123927
160-6793-39	BMAC-GRASS-4	Total/NA	Solid	ExtChrom	123927
160-6793-40	BMAC-GRASS-5	Total/NA	Solid	ExtChrom	123927
160-6793-41	BMAC-GRASS-6	Total/NA	Solid	ExtChrom	123927
160-6793-42	BMAC-GRASS-7	Total/NA	Solid	ExtChrom	123927
160-6793-43	BMAC-GRASS-8	Total/NA	Solid	ExtChrom	123927
160-6793-44	BMAC-GRASS-9	Total/NA	Solid	ExtChrom	123927
160-6793-45	BMAC-GRASS-10	Total/NA	Solid	ExtChrom	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124608 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-46	BMAC-GRASS-11	Total/NA	Solid	ExtChrom	123927
160-6793-47	BMAC-GRASS-12	Total/NA	Solid	ExtChrom	123927
160-6793-48	BMAC-GRASS-13	Total/NA	Solid	ExtChrom	123927
160-6793-49	BMAC-GRASS-14	Total/NA	Solid	ExtChrom	123927
160-6793-50	BMAC-GRASS-15	Total/NA	Solid	ExtChrom	123927
160-6793-51	BMAC-GRASS-16	Total/NA	Solid	ExtChrom	123927
160-6793-52	BMAC-GRASS-17	Total/NA	Solid	ExtChrom	123927
160-6793-53	BMAC-GRASS-18	Total/NA	Solid	ExtChrom	123927
160-6793-54	BMAC-GRASS-19	Total/NA	Solid	ExtChrom	123927
160-6793-55	BMAC-GRASS-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124608/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124608/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 124609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-56	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-56 DU	BMAC-GRASS-21	Total/NA	Solid	ExtChrom	123927
160-6793-57	BMAC-GRASS-22	Total/NA	Solid	ExtChrom	123927
160-6793-58	BMAC-GRASS-23	Total/NA	Solid	ExtChrom	123927
160-6793-59	BMAC-GRASS-24	Total/NA	Solid	ExtChrom	123927
160-6793-60	BMAC-GRASS-25	Total/NA	Solid	ExtChrom	123927
160-6793-61	BMAC-GRASS-26	Total/NA	Solid	ExtChrom	123927
160-6793-62	BMAC-GRASS-27	Total/NA	Solid	ExtChrom	123927
160-6793-63	BMAC-GRASS-28	Total/NA	Solid	ExtChrom	123927
160-6793-64	BMAC-GRASS-29	Total/NA	Solid	ExtChrom	123927
160-6793-65	BMAC-GRASS-30	Total/NA	Solid	ExtChrom	123927
160-6793-66	BMAC-SOIL-1	Total/NA	Solid	ExtChrom	123927
160-6793-67	BMAC-SOIL-2	Total/NA	Solid	ExtChrom	123927
160-6793-68	BMAC-SOIL-3	Total/NA	Solid	ExtChrom	123927
160-6793-69	BMAC-SOIL-4	Total/NA	Solid	ExtChrom	123927
160-6793-70	BMAC-SOIL-5	Total/NA	Solid	ExtChrom	123927
160-6793-71	BMAC-SOIL-6	Total/NA	Solid	ExtChrom	123927
160-6793-72	BMAC-SOIL-7	Total/NA	Solid	ExtChrom	123927
160-6793-73	BMAC-SOIL-8	Total/NA	Solid	ExtChrom	123927
LCS 160-124609/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124609/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 124610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-74	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-74 DU	BMAC-SOIL-9	Total/NA	Solid	ExtChrom	123927
160-6793-75	BMAC-SOIL-10	Total/NA	Solid	ExtChrom	123927
160-6793-76	BMAC-SOIL-11	Total/NA	Solid	ExtChrom	123927
160-6793-77	BMAC-SOIL-12	Total/NA	Solid	ExtChrom	123927
160-6793-78	BMAC-SOIL-13	Total/NA	Solid	ExtChrom	123927
160-6793-79	BMAC-SOIL-14	Total/NA	Solid	ExtChrom	123927
160-6793-80	BMAC-SOIL-15	Total/NA	Solid	ExtChrom	123927
160-6793-81	BMAC-SOIL-16	Total/NA	Solid	ExtChrom	123927
160-6793-82	BMAC-SOIL-17	Total/NA	Solid	ExtChrom	123927
160-6793-83	BMAC-SOIL-18	Total/NA	Solid	ExtChrom	123927
160-6793-84	BMAC-SOIL-19	Total/NA	Solid	ExtChrom	123927

TestAmerica St. Louis

# QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Rad (Continued)

### Prep Batch: 124610 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-85	BMAC-SOIL-20	Total/NA	Solid	ExtChrom	123927
160-6793-86	BMAC-SOIL-21	Total/NA	Solid	ExtChrom	123927
160-6793-87	BMAC-SOIL-22	Total/NA	Solid	ExtChrom	123927
160-6793-88	BMAC-SOIL-23	Total/NA	Solid	ExtChrom	123927
160-6793-89	BMAC-SOIL-24	Total/NA	Solid	ExtChrom	123927
160-6793-90	BMAC-SOIL-25	Total/NA	Solid	ExtChrom	123927
160-6793-91	BMAC-SOIL-26	Total/NA	Solid	ExtChrom	123927
160-6793-92	BMAC-SOIL-27	Total/NA	Solid	ExtChrom	123927
LCS 160-124610/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124610/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 124634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-93	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-93 DU	BMAC-SOIL-28	Total/NA	Solid	ExtChrom	123927
160-6793-94	BMAC-SOIL-29	Total/NA	Solid	ExtChrom	123927
160-6793-95	BMAC-SOIL-30	Total/NA	Solid	ExtChrom	123927
160-6793-96	BMAC-OUTFALL-2	Total/NA	Solid	ExtChrom	123927
160-6793-97	BMAC-OUTFALL-3	Total/NA	Solid	ExtChrom	123927
160-6793-98	BMAC-OUTFALL-4	Total/NA	Solid	ExtChrom	123927
160-6793-99	BMAC-OUTFALL-5	Total/NA	Solid	ExtChrom	123927
160-6793-100	BMAC-OUTFALL-6	Total/NA	Solid	ExtChrom	123927
160-6793-101	BMAC-OUTFALL-7	Total/NA	Solid	ExtChrom	123927
160-6793-102	BMAC-OUTFALL-8	Total/NA	Solid	ExtChrom	123927
160-6793-103	BMAC-OUTFALL-9	Total/NA	Solid	ExtChrom	123927
160-6793-104	BMAC-OUTFALL-10	Total/NA	Solid	ExtChrom	123927
160-6793-105	BMAC-OUTFALL-11	Total/NA	Solid	ExtChrom	123927
160-6793-106	BMAC-OUTFALL-14	Total/NA	Solid	ExtChrom	123927
160-6793-107	BMAC-OUTFALL-15	Total/NA	Solid	ExtChrom	123927
160-6793-108	BMAC-OUTFALL-16	Total/NA	Solid	ExtChrom	123927
160-6793-109	BMAC-OUTFALL-17	Total/NA	Solid	ExtChrom	123927
160-6793-110	BMAC-OUTFALL-18	Total/NA	Solid	ExtChrom	123927
160-6793-111	BMAC-OUTFALL-19	Total/NA	Solid	ExtChrom	123927
160-6793-112	BMAC-OUTFALL-20	Total/NA	Solid	ExtChrom	123927
LCS 160-124634/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-124634/1-A	Method Blank	Total/NA	Solid	ExtChrom	

### Prep Batch: 125139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-21	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-21 DU	KOCH-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-22	KOCH-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-23	KOCH-GRASS-6	Total/NA	Solid	ExtChrom	123686
160-6793-24	BLANCHETTE-SOIL-1	Total/NA	Solid	ExtChrom	123686
160-6793-25	BLANCHETTE-SOIL-2	Total/NA	Solid	ExtChrom	123686
160-6793-26	BLANCHETTE-SOIL-3	Total/NA	Solid	ExtChrom	123686
160-6793-27	BLANCHETTE-SOIL-4	Total/NA	Solid	ExtChrom	123686
160-6793-28	BLANCHETTE-SOIL-5	Total/NA	Solid	ExtChrom	123686
160-6793-29	BLANCHETTE-SOIL-6	Total/NA	Solid	ExtChrom	123686
160-6793-30	BLANCHETTE-GRASS-1	Total/NA	Solid	ExtChrom	123686
160-6793-31	BLANCHETTE-GRASS-2	Total/NA	Solid	ExtChrom	123686

TestAmerica St. Louis

## QC Association Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

### Rad (Continued)

#### Prep Batch: 125139 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6793-32	BLANCHETTE-GRASS-3	Total/NA	Solid	ExtChrom	123686
160-6793-33	BLANCHETTE-GRASS-4	Total/NA	Solid	ExtChrom	123686
160-6793-34	BLANCHETTE-GRASS-5	Total/NA	Solid	ExtChrom	123686
160-6793-35	BLANCHETTE-GRASS-6	Total/NA	Solid	ExtChrom	123686
LCS 160-125139/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-125139/1-A	Method Blank	Total/NA	Solid	ExtChrom	

# Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Th-229	(30-110)
160-6793-1	BMAC-DISCRETE-00	77.9	
160-6793-1 DU	BMAC-DISCRETE-00	78.7	
160-6793-2	BMAC-DISCRETE-1	87.2	
160-6793-3	BMAC-DISCRETE-2	89.1	
160-6793-4	BMAC-DISCRETE-3	83.9	
160-6793-5	BMAC-DISCRETE-4	82.7	
160-6793-6	BMAC-DISCRETE-5	87.3	
160-6793-7	BMAC-DISCRETE-6	80.0	
160-6793-8	BMAC-DISCRETE-7	92.7	
160-6793-9	BMAC-DISCRETE-8	83.8	
160-6793-10	BMAC-DISCRETE-9	81.5	
160-6793-11	BMAC-DISCRETE-10	77.6	
160-6793-12	KOCH-SOIL-1	73.2	
160-6793-13	KOCH-SOIL-2	69.6	
160-6793-14	KOCH-SOIL-3	48.9	
160-6793-15	KOCH-SOIL-4	76.0	
160-6793-16	KOCH-SOIL-5	82.2	
160-6793-17	KOCH-SOIL-6	79.0	
160-6793-18	KOCH-GRASS-1	70.1	
160-6793-19	KOCH-GRASS-2	74.8	
160-6793-20	KOCH-GRASS-3	80.4	
160-6793-21	KOCH-GRASS-4	94.4	
160-6793-21 DU	KOCH-GRASS-4	91.7	
160-6793-22	KOCH-GRASS-5	84.3	
160-6793-23	KOCH-GRASS-6	86.2	
160-6793-24	BLANCHETTE-SOIL-1	87.0	
160-6793-25	BLANCHETTE-SOIL-2	87.5	
160-6793-26	BLANCHETTE-SOIL-3	86.0	
160-6793-27	BLANCHETTE-SOIL-4	89.1	
160-6793-28	BLANCHETTE-SOIL-5	85.2	
160-6793-29	BLANCHETTE-SOIL-6	81.4	
160-6793-30	BLANCHETTE-GRASS-1	86.3	
160-6793-31	BLANCHETTE-GRASS-2	83.6	
160-6793-32	BLANCHETTE-GRASS-3	88.5	
160-6793-33	BLANCHETTE-GRASS-4	89.7	
160-6793-34	BLANCHETTE-GRASS-5	86.4	
160-6793-35	BLANCHETTE-GRASS-6	81.3	
160-6793-36	BMAC-GRASS-1	84.7	
160-6793-36 DU	BMAC-GRASS-1	93.0	
160-6793-37	BMAC-GRASS-2	86.8	
160-6793-38	BMAC-GRASS-3	84.5	
160-6793-39	BMAC-GRASS-4	88.3	
160-6793-40	BMAC-GRASS-5	89.0	
160-6793-41	BMAC-GRASS-6	82.8	
160-6793-42	BMAC-GRASS-7	89.4	
160-6793-43	BMAC-GRASS-8	86.6	
160-6793-44	BMAC-GRASS-9	81.4	
160-6793-45	BMAC-GRASS-10	87.8	
160-6793-46	BMAC-GRASS-11	87.4	

TestAmerica St. Louis

# Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Th-229	(30-110)
160-6793-47	BMAC-GRASS-12	82.9	
160-6793-48	BMAC-GRASS-13	85.3	
160-6793-49	BMAC-GRASS-14	85.9	
160-6793-50	BMAC-GRASS-15	95.3	
160-6793-51	BMAC-GRASS-16	91.3	
160-6793-52	BMAC-GRASS-17	78.3	
160-6793-53	BMAC-GRASS-18	97.2	
160-6793-54	BMAC-GRASS-19	89.0	
160-6793-55	BMAC-GRASS-20	89.3	
160-6793-56	BMAC-GRASS-21	79.2	
160-6793-56 DU	BMAC-GRASS-21	80.6	
160-6793-57	BMAC-GRASS-22	88.4	
160-6793-58	BMAC-GRASS-23	85.7	
160-6793-59	BMAC-GRASS-24	89.6	
160-6793-60	BMAC-GRASS-25	83.2	
160-6793-61	BMAC-GRASS-26	89.8	
160-6793-62	BMAC-GRASS-27	89.4	
160-6793-63	BMAC-GRASS-28	85.4	
160-6793-64	BMAC-GRASS-29	89.2	
160-6793-65	BMAC-GRASS-30	89.2	
160-6793-66	BMAC-SOIL-1	89.3	
160-6793-67	BMAC-SOIL-2	91.2	
160-6793-68	BMAC-SOIL-3	88.5	
160-6793-69	BMAC-SOIL-4	78.8	
160-6793-70	BMAC-SOIL-5	83.9	
160-6793-71	BMAC-SOIL-6	79.0	
160-6793-72	BMAC-SOIL-7	92.7	
160-6793-73	BMAC-SOIL-8	88.6	
160-6793-74	BMAC-SOIL-9	81.0	
160-6793-74 DU	BMAC-SOIL-9	94.8	
160-6793-75	BMAC-SOIL-10	80.2	
160-6793-76	BMAC-SOIL-11	83.8	
160-6793-77	BMAC-SOIL-12	81.7	
160-6793-78	BMAC-SOIL-13	86.3	
160-6793-79	BMAC-SOIL-14	84.7	
160-6793-80	BMAC-SOIL-15	79.2	
160-6793-81	BMAC-SOIL-16	83.4	
160-6793-82	BMAC-SOIL-17	82.5	
160-6793-83	BMAC-SOIL-18	98.7	
160-6793-84	BMAC-SOIL-19	81.3	
160-6793-85	BMAC-SOIL-20	82.6	
160-6793-86	BMAC-SOIL-21	95.4	
160-6793-87	BMAC-SOIL-22	91.7	
160-6793-88	BMAC-SOIL-23	74.9	
160-6793-89	BMAC-SOIL-24	77.9	
160-6793-90	BMAC-SOIL-25	91.5	
160-6793-91	BMAC-SOIL-26	83.7	
160-6793-92	BMAC-SOIL-27	88.2	
160-6793-93	BMAC-SOIL-28	85.5	

TestAmerica St. Louis

## Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

### Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Th-229 (30-110)	
160-6793-93 DU	BMAC-SOIL-28	76.5	
160-6793-94	BMAC-SOIL-29	89.7	
160-6793-95	BMAC-SOIL-30	89.9	
160-6793-96	BMAC-OUTFALL-2	95.1	
160-6793-97	BMAC-OUTFALL-3	83.5	
160-6793-98	BMAC-OUTFALL-4	98.3	
160-6793-99	BMAC-OUTFALL-5	83.6	
160-6793-100	BMAC-OUTFALL-6	84.8	
160-6793-101	BMAC-OUTFALL-7	85.9	
160-6793-102	BMAC-OUTFALL-8	80.8	
160-6793-103	BMAC-OUTFALL-9	88.4	
160-6793-104	BMAC-OUTFALL-10	80.3	
160-6793-105	BMAC-OUTFALL-11	91.6	
160-6793-106	BMAC-OUTFALL-14	90.3	
160-6793-107	BMAC-OUTFALL-15	87.9	
160-6793-108	BMAC-OUTFALL-16	83.4	
160-6793-109	BMAC-OUTFALL-17	80.3	
160-6793-110	BMAC-OUTFALL-18	91.6	
160-6793-111	BMAC-OUTFALL-19	82.5	
160-6793-112	BMAC-OUTFALL-20	97.9	
LCS 160-123904/2-A	Lab Control Sample	82.8	
LCS 160-124407/2-A	Lab Control Sample	91.1	
LCS 160-124409/2-A	Lab Control Sample	88.8	
LCS 160-124410/2-A	Lab Control Sample	89.0	
LCS 160-124412/2-A	Lab Control Sample	94.8	
LCS 160-125139/2-A	Lab Control Sample	87.0	
MB 160-123904/1-A	Method Blank	89.3	
MB 160-124407/1-A	Method Blank	88.2	
MB 160-124409/1-A	Method Blank	93.6	
MB 160-124410/1-A	Method Blank	85.9	
MB 160-124412/1-A	Method Blank	89.6	
MB 160-125139/1-A	Method Blank	91.6	

#### Tracer/Carrier Legend

Th-229 = Thorium-229

### Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232 (30-110)	
160-6793-1	BMAC-DISCRETE-00	76.4	
160-6793-1 DU	BMAC-DISCRETE-00	77.1	
160-6793-2	BMAC-DISCRETE-1	77.5	
160-6793-3	BMAC-DISCRETE-2	72.3	
160-6793-4	BMAC-DISCRETE-3	73.8	
160-6793-5	BMAC-DISCRETE-4	83.1	
160-6793-6	BMAC-DISCRETE-5	94.5	

TestAmerica St. Louis

# Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232	(30-110)
160-6793-7	BMAC-DISCRETE-6	73.1	
160-6793-8	BMAC-DISCRETE-7	89.0	
160-6793-9	BMAC-DISCRETE-8	69.9	
160-6793-10	BMAC-DISCRETE-9	85.0	
160-6793-11	BMAC-DISCRETE-10	83.2	
160-6793-12	KOCH-SOIL-1	78.8	
160-6793-13	KOCH-SOIL-2	75.4	
160-6793-14	KOCH-SOIL-3	45.9	
160-6793-15	KOCH-SOIL-4	74.6	
160-6793-16	KOCH-SOIL-5	86.9	
160-6793-17	KOCH-SOIL-6	75.9	
160-6793-18	KOCH-GRASS-1	70.5	
160-6793-19	KOCH-GRASS-2	78.0	
160-6793-20	KOCH-GRASS-3	77.6	
160-6793-21	KOCH-GRASS-4	83.4	
160-6793-21 DU	KOCH-GRASS-4	72.6	
160-6793-22	KOCH-GRASS-5	85.8	
160-6793-23	KOCH-GRASS-6	77.7	
160-6793-24	BLANCHETTE-SOIL-1	81.3	
160-6793-25	BLANCHETTE-SOIL-2	87.8	
160-6793-26	BLANCHETTE-SOIL-3	88.0	
160-6793-27	BLANCHETTE-SOIL-4	94.7	
160-6793-28	BLANCHETTE-SOIL-5	86.9	
160-6793-29	BLANCHETTE-SOIL-6	86.1	
160-6793-30	BLANCHETTE-GRASS-1	64.3	
160-6793-31	BLANCHETTE-GRASS-2	69.1	
160-6793-32	BLANCHETTE-GRASS-3	71.8	
160-6793-33	BLANCHETTE-GRASS-4	71.8	
160-6793-34	BLANCHETTE-GRASS-5	75.2	
160-6793-35	BLANCHETTE-GRASS-6	64.5	
160-6793-36	BMAC-GRASS-1	91.8	
160-6793-36 DU	BMAC-GRASS-1	82.3	
160-6793-37	BMAC-GRASS-2	92.9	
160-6793-38	BMAC-GRASS-3	78.2	
160-6793-39	BMAC-GRASS-4	91.3	
160-6793-40	BMAC-GRASS-5	89.9	
160-6793-41	BMAC-GRASS-6	82.9	
160-6793-42	BMAC-GRASS-7	88.2	
160-6793-43	BMAC-GRASS-8	85.0	
160-6793-44	BMAC-GRASS-9	58.3	
160-6793-45	BMAC-GRASS-10	82.2	
160-6793-46	BMAC-GRASS-11	81.6	
160-6793-47	BMAC-GRASS-12	75.4	
160-6793-48	BMAC-GRASS-13	86.0	
160-6793-49	BMAC-GRASS-14	84.1	
160-6793-50	BMAC-GRASS-15	83.7	
160-6793-51	BMAC-GRASS-16	78.0	
160-6793-52	BMAC-GRASS-17	75.5	
160-6793-53	BMAC-GRASS-18	88.6	



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TestAmerica St. Louis

# Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

Project/Site: Bridgeton Municipal Athletic Complex

TestAmerica Job ID: 160-6793-1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232	(30-110)
160-6793-54	BMAC-GRASS-19	76.7	
160-6793-55	BMAC-GRASS-20	83.8	
160-6793-56	BMAC-GRASS-21	81.6	
160-6793-56 DU	BMAC-GRASS-21	74.5	
160-6793-57	BMAC-GRASS-22	85.0	
160-6793-58	BMAC-GRASS-23	90.9	
160-6793-59	BMAC-GRASS-24	93.7	
160-6793-60	BMAC-GRASS-25	96.3	
160-6793-61	BMAC-GRASS-26	91.8	
160-6793-62	BMAC-GRASS-27	89.6	
160-6793-63	BMAC-GRASS-28	88.1	
160-6793-64	BMAC-GRASS-29	88.1	
160-6793-65	BMAC-GRASS-30	88.1	
160-6793-66	BMAC-SOIL-1	87.5	
160-6793-67	BMAC-SOIL-2	86.7	
160-6793-68	BMAC-SOIL-3	88.1	
160-6793-69	BMAC-SOIL-4	81.5	
160-6793-70	BMAC-SOIL-5	82.8	
160-6793-71	BMAC-SOIL-6	87.3	
160-6793-72	BMAC-SOIL-7	89.4	
160-6793-73	BMAC-SOIL-8	92.3	
160-6793-74	BMAC-SOIL-9	69.0	
160-6793-74 DU	BMAC-SOIL-9	82.7	
160-6793-75	BMAC-SOIL-10	79.7	
160-6793-76	BMAC-SOIL-11	73.7	
160-6793-77	BMAC-SOIL-12	80.5	
160-6793-78	BMAC-SOIL-13	83.5	
160-6793-79	BMAC-SOIL-14	84.4	
160-6793-80	BMAC-SOIL-15	82.0	
160-6793-81	BMAC-SOIL-16	89.4	
160-6793-82	BMAC-SOIL-17	84.6	
160-6793-83	BMAC-SOIL-18	83.7	
160-6793-84	BMAC-SOIL-19	80.4	
160-6793-85	BMAC-SOIL-20	86.3	
160-6793-86	BMAC-SOIL-21	77.9	
160-6793-87	BMAC-SOIL-22	78.9	
160-6793-88	BMAC-SOIL-23	84.2	
160-6793-89	BMAC-SOIL-24	76.0	
160-6793-90	BMAC-SOIL-25	84.0	
160-6793-91	BMAC-SOIL-26	85.3	
160-6793-92	BMAC-SOIL-27	84.1	
160-6793-93	BMAC-SOIL-28	77.2	
160-6793-93 DU	BMAC-SOIL-28	83.7	
160-6793-94	BMAC-SOIL-29	86.3	
160-6793-95	BMAC-SOIL-30	87.3	
160-6793-96	BMAC-OUTFALL-2	78.3	
160-6793-97	BMAC-OUTFALL-3	77.9	
160-6793-98	BMAC-OUTFALL-4	83.1	
160-6793-99	BMAC-OUTFALL-5	90.8	

TestAmerica St. Louis

# Tracer/Carrier Summary

Client: Tetra Tech EM Inc.

TestAmerica Job ID: 160-6793-1

Project/Site: Bridgeton Municipal Athletic Complex

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232	(30-110)
160-6793-100	BMAC-OUTFALL-6	79.0	
160-6793-101	BMAC-OUTFALL-7	85.3	
160-6793-102	BMAC-OUTFALL-8	79.4	
160-6793-103	BMAC-OUTFALL-9	84.4	
160-6793-104	BMAC-OUTFALL-10	90.8	
160-6793-105	BMAC-OUTFALL-11	76.5	
160-6793-106	BMAC-OUTFALL-14	88.3	
160-6793-107	BMAC-OUTFALL-15	94.6	
160-6793-108	BMAC-OUTFALL-16	82.3	
160-6793-109	BMAC-OUTFALL-17	84.5	
160-6793-110	BMAC-OUTFALL-18	84.6	
160-6793-111	BMAC-OUTFALL-19	84.8	
160-6793-112	BMAC-OUTFALL-20	76.6	
LCS 160-123926/2-A	Lab Control Sample	77.8	
LCS 160-123942/2-A	Lab Control Sample	85.0	
LCS 160-124608/2-A	Lab Control Sample	84.3	
LCS 160-124609/2-A	Lab Control Sample	91.9	
LCS 160-124610/2-A	Lab Control Sample	76.8	
LCS 160-124634/2-A	Lab Control Sample	81.5	
MB 160-123926/1-A	Method Blank	89.2	
MB 160-123942/1-A	Method Blank	88.0	
MB 160-124608/1-A	Method Blank	86.9	
MB 160-124609/1-A	Method Blank	85.4	
MB 160-124610/1-A	Method Blank	82.9	
MB 160-124634/1-A	Method Blank	79.7	

### Tracer/Carrier Legend

U-232 = Uranium-232

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TestAmerica St. Louis

**APPENDIX F**  
**DATA VALIDATION REPORT**

**Tetra Tech, Inc.**  
**DATA VALIDATION REPORT**  
**LEVEL II**

Site: Bridgeton Municipal Athletic Complex

Laboratory: TestAmerica Laboratories, St. Louis, Missouri

Data Reviewer: Jessica Vickers, Tetra Tech, Inc. (Tetra Tech)

Review Date June 23, 2014

Sample Delivery Group (SDG): 160-6793-1

Sample Numbers:

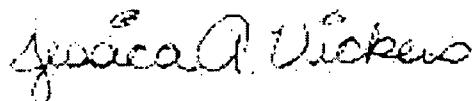
BLANCHETTE-GRASS-1, BLANCHETTE-GRASS-2, BLANCHETTE-GRASS-3,  
BLANCHETTE-GRASS-4, BLANCHETTE-GRASS-5, BLANCHETTE-GRASS-6,  
BLANCHETTE-SOIL-1, BLANCHETTE-SOIL-2, BLANCHETTE-SOIL-3,  
BLANCHETTE-SOIL-4, BLANCHETTE-SOIL-5, BLANCHETTE-SOIL-6, BMAC-DISCRETE-00,  
BMAC-DISCRETE-1, BMAC-DISCRETE-2, BMAC-DISCRETE-3, BMAC-DISCRETE-4,  
BMAC-DISCRETE-5, BMAC-DISCRETE-6, BMAC-DISCRETE-7, BMAC-DISCRETE-8,  
BMAC-DISCRETE-9, BMAC-DISCRETE-10, BMAC-GRASS-1, BMAC-GRASS-2,  
BMAC-GRASS-3, BMAC-GRASS-4, BMAC-GRASS-5, BMAC-GRASS-6, BMAC-GRASS-7,  
BMAC-GRASS-8, BMAC-GRASS-9, BMAC-GRASS-10, BMAC-GRASS-11, BMAC-GRASS-12,  
BMAC-GRASS-13, BMAC-GRASS-14, BMAC-GRASS-15, BMAC-GRASS-16, BMAC-GRASS-17,  
BMAC-GRASS-18, BMAC-GRASS-19, BMAC-GRASS-20, BMAC-GRASS-21, BMAC-GRASS-22,  
BMAC-GRASS-23, BMAC-GRASS-24, BMAC-GRASS-25, BMAC-GRASS-26, BMAC-GRASS-27,  
BMAC-GRASS-28, BMAC-GRASS-29, BMAC-GRASS-30, BMAC-OUTFALL-2,  
BMAC-OUTFALL-3, BMAC-OUTFALL-4, BMAC-OUTFALL-5, BMAC-OUTFALL-6,  
BMAC-OUTFALL-7, BMAC-OUTFALL-8, BMAC-OUTFALL-9, BMAC-OUTFALL-10,  
BMAC-OUTFALL-11, BMAC-OUTFALL-14, BMAC-OUTFALL-15, BMAC-OUTFALL-16,  
BMAC-OUTFALL-17, BMAC-OUTFALL-18, BMAC-OUTFALL-19, BMAC-OUTFALL-20,  
BMAC-SOIL-1, BMAC-SOIL-2, BMAC-SOIL-3, BMAC-SOIL-4, BMAC-SOIL-5, BMAC-SOIL-6,  
BMAC-SOIL-7, BMAC-SOIL-8, BMAC-SOIL-9, BMAC-SOIL-10, BMAC-SOIL-11,  
BMAC-SOIL-12, BMAC-SOIL-13, BMAC-SOIL-14, BMAC-SOIL-15, BMAC-SOIL-16,  
BMAC-SOIL-17, BMAC-SOIL-18, BMAC-SOIL-19, BMAC-SOIL-20, BMAC-SOIL-21,  
BMAC-SOIL-22, BMAC-SOIL-23, BMAC-SOIL-24, BMAC-SOIL-25, BMAC-SOIL-26,  
BMAC-SOIL-27, BMAC-SOIL-28, BMAC-SOIL-29, BMAC-SOIL-30, KOCH-GRASS-1,  
KOCH-GRASS-2, KOCH-GRASS-3, KOCH-GRASS-4, KOCH-GRASS-5, KOCH-GRASS-6,  
KOCH-SOIL-1, KOCH-SOIL-2, KOCH-SOIL-3, KOCH-SOIL-4, KOCH-SOIL-5, and KOCH-SOIL-6

Matrix /Number of Samples: 112 Solid Samples

The data were qualified according to the U.S. Environmental Protection Agency (EPA) Region 7 documents entitled "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review" (9240.1-51, January 2010) and Chapter 8 of "Multi-Agency Radiological Laboratory Analytical Procedures Manual (MARLAP, 402-B-04-001A, July 2004). In addition, the Tetra Tech document "Review of Data Packages from Subcontracted Laboratories" (February 2002) was used along with other criteria specified in the applicable methods.

The review was intended to identify problems and quality control (QC) deficiencies that were readily apparent from the summary data package. The following sections discuss any problems or deficiencies that were found, and data qualifications applied because of non-compliant QC. The data review was limited to the available field and laboratory QC information submitted with the project specific data package.

I, Jessica A. Vickers, certify that all data validation criteria outlined in the above referenced documents were assessed, and any qualifications made to the data were in accordance with those documents.



June 23, 2014

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Certified by Jessica A. Vickers, Chemist

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Date

#### **DATA VALIDATION QUALIFIERS**

- U** — The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J** — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+** — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.
- J-** — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased low.
- UJ** — The analyte was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.
- R** — The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

## DATA ASSESSMENT

Sample delivery group (SDG) 160-6783-1 included one hundred twelve (112) environmental solid samples collected on May 21 through 23, 2014. The samples were analyzed for radioactive isotopes of uranium and thorium using alpha spectroscopy (Method A-01-R) and radioactive isotopes using gamma spectroscopy (Method GA-01-R) following the Department of Energy's Environmental Measurements Laboratory (EML) Procedures Manual HASL-300. The following summarizes the data validation that was performed.

### RADIOLOGICAL ANALYSIS

#### I. Holding Time and Chain of Custody (COC) Requirements

All samples were received by the laboratory and analyzed within the customary holding time of 6 months from sample collection to analysis. No data were qualified.

#### II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD analyses are not used with radiological analyses. The laboratory duplicate and LCS results provided adequate data on precision and accuracy. No data were qualified.

#### III. Blanks

Measurable detections of thorium-230, thorium-232, uranium-238, and/or lead-214 were detected in at least one of the method blanks associated with this SDG. The NFGs state that results below the blank value should be considered non-detectable (flagged "U") at the MDC, and that results above the blank concentration but less than 10 times the value should be flagged "J+". Thus, the following data were qualified:

- The lead-212 results (by gamma spectroscopy) for these samples were qualified as estimated with a possible high bias (flagged "J+"):

BMAC-SOIL-11	BMAC-OUTFALL-14	BMAC-OUTFALL-18
BMAC-OUTFALL-7	BMAC-OUTFALL-16	
BMAC-OUTFALL-8	BMAC-OUTFALL-17	

- The thorium-230 (by isotopic thorium analysis) results for these samples were qualified as estimated with a possible high bias (flagged "J+"):

BMAC-GRASS-1	BMAC-GRASS-19	BMAC-SOIL-14
BMAC-GRASS-2	BMAC-GRASS-20	BMAC-SOIL-15
BMAC-GRASS-3	BMAC-GRASS-23	BMAC-SOIL-16
BMAC-GRASS-6	BMAC-GRASS-27	BMAC-SOIL-17
BMAC-GRASS-8	BMAC-GRASS-29	BMAC-SOIL-18
BMAC-GRASS-9	BMAC-SOIL-1	BMAC-SOIL-19
BMAC-GRASS-11	BMAC-SOIL-2	BMAC-SOIL-20
BMAC-GRASS-12	BMAC-SOIL-3	BMAC-SOIL-21
BMAC-GRASS-13	BMAC-SOIL-7	BMAC-SOIL-22
BMAC-GRASS-14	BMAC-SOIL-9	BMAC-SOIL-23

BMAC-GRASS-15	BMAC-SOIL-10	BMAC-SOIL-26
BMAC-GRASS-16	BMAC-SOIL-11	BMAC-SOIL-27
BMAC-GRASS-17	BMAC-SOIL-12	
BMAC-GRASS-18	BMAC-SOIL-13	

- The uranium-238 results (by alpha spectroscopy) for these samples were qualified as estimated with a possible high bias (flagged "J+"): 

BMAC-DISCRETE-5	BMAC-DISCRETE-8	KOCH-SOIL-1
BMAC-DISCRETE-7	BMAC-DISCRETE-9	KOCH-SOIL-2
- In addition, the thorium-230 (by isotopic thorium analysis) results for these samples were qualified as non-detect (flagged "U"). 

BMAC-SOIL-24	BMAC-SOIL-25
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#### IV. Laboratory Control Sample (LCS)

Percent recoveries for the LCS analyses were within established control limits. No data were qualified.

#### V. Comments

Most laboratory duplicate results were well within their quality control limits for relative error ratio (RER). The exceptions were related to the gamma spectroscopy analyses of bismuth-212 for sample BMAC-GRASS-21 and actinium-227, actinium-228, radium-228, and thorium-232 for sample BMAC-OUTFALL-6, which all had RERs greater than 1. Therefore, the associated results were qualified as estimated (flagged "J").

#### VI. Overall Assessment of Data

Overall data quality is acceptable, with no unusual qualifications added. All data are usable as qualified for their intended purposes.

**APPENDIX G**  
**BACKGROUND THRESHOLD VALUE CALCULATION SPREADSHEETS DATA**





A	B	C	D	E	F	G	H	I	J	K	L									
<b>Normal GOF Test</b>																				
100	Shapiro Wilk Test Statistic			0.901	<b>Shapiro Wilk GOF Test</b>															
101	5% Shapiro Wilk Critical Value			0.916	Data Not Normal at 5% Significance Level															
102	Lilliefors Test Statistic			0.134	<b>Lilliefors GOF Test</b>															
103	5% Lilliefors Critical Value			0.181	Data appear Normal at 5% Significance Level															
104	Data appear Approximate Normal at 5% Significance Level																			
105																				
106																				
107	<b>Background Statistics Assuming Normal Distribution</b>																			
108	95% UTL with 95% Coverage			0.879																
109	95% UPL (t)			0.82																
110	95% USL			0.915																
111																				
112	<b>Gamma GOF Test</b>																			
113	A-D Test Statistic			0.553	<b>Anderson-Darling Gamma GOF Test</b>															
114	5% A-D Critical Value			0.742	Detected data appear Gamma Distributed at 5% Significance Level															
115	K-S Test Statistic			0.114	<b>Kolmogorov-Smirnov Gamma GOF Test</b>															
116	5% K-S Critical Value			0.177	Detected data appear Gamma Distributed at 5% Significance Level															
117	Detected data appear Gamma Distributed at 5% Significance Level																			
118																				
119	<b>Gamma Statistics</b>																			
120	k hat (MLE)			41.1																
121	Theta hat (MLE)			0.0155																
122	nu hat (MLE)			1973																
123	MLE Mean (bias corrected)			0.636																
124																				
125	<b>Background Statistics Assuming Gamma Distribution</b>																			
126	95% Wilson Hilferty (WH) Approx. Gamma UPL			0.824																
127	95% Hawkins Wixley (HW) Approx. Gamma UPL			0.825																
128	95% WH Approx. Gamma UTL with 95% Coverage			0.893																
129	95% HW Approx. Gamma UTL with 95% Coverage			0.895																
130	95% WH USL			0.937																
131																				
132	<b>Lognormal GOF Test</b>																			
133	Shapiro Wilk Test Statistic			0.933	<b>Shapiro Wilk Lognormal GOF Test</b>															
134	5% Shapiro Wilk Critical Value			0.916	Data appear Lognormal at 5% Significance Level															
135	Lilliefors Test Statistic			0.104	<b>Lilliefors Lognormal GOF Test</b>															
136	5% Lilliefors Critical Value			0.181	Data appear Lognormal at 5% Significance Level															
137	Data appear Lognormal at 5% Significance Level																			
138																				
139	<b>Background Statistics assuming Lognormal Distribution</b>																			
140	95% UTL with 95% Coverage			0.903																
141	95% UPL (t)			0.827																
142	95% USL			0.951																
143																				
144	<b>Nonparametric Distribution Free Background Statistics</b>																			
145	Data appear Approximate Normal at 5% Significance Level																			
146																				
147	<b>Nonparametric Upper Limits for Background Threshold Values</b>																			
148	Order of Statistic, r	24										95% UTL with 95% Coverage	0.896							
149	Approximate f	1.263										Confidence Coefficient (CC) achieved by UTL	0.708							











A	B	C	D	E	F	G	H	I	J	K	L
Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.											
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.											
Pb210											
General Statistics											
208	Total Number of Observations	24		Number of Missing Observations	0						
209	Number of Distinct Observations	22									
210	Number of Detects	2		Number of Non-Detects	22						
211	Number of Distinct Detects	2		Number of Distinct Non-Detects	20						
212	Minimum Detect	2.79		Minimum Non-Detect	-0.0589						
213	Maximum Detect	4.12		Maximum Non-Detect	3.34						
214	Variance Detected	0.884		Percent Non-Detects	91.67%						
215	Mean Detected	3.455		SD Detected	0.94						
Warning: Data set has only 2 Detected Values.											
217	This is not enough to compute meaningful or reliable statistics and estimates.										
Critical Values for Background Threshold Values (BTVs)											
222	Tolerance Factor K (For UTL)	2.309		d2max (for USL)	2.644						
Normal GOF Test on Detects Only											
225	Not Enough Data to Perform GOF Test										
Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
228	Mean	0.252		SD	1.01						
229	95% UTL95% Coverage	2.584		95% KM UPL (t)	2.018						
230	90% KM Percentile (z)	1.546		95% KM Percentile (z)	1.913						
231	99% KM Percentile (z)	2.601		95% KM USL	2.922						
DL/2 Substitution Background Statistics Assuming Normal Distribution											
234	Mean	1.129		SD	0.889						
235	95% UTL95% Coverage	3.182		95% UPL (t)	2.684						
236	90% Percentile (z)	2.268		95% Percentile (z)	2.591						
237	99% Percentile (z)	3.197		95% USL	3.479						
DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
Gamma GOF Tests on Detected Observations Only											
241	Not Enough Data to Perform GOF Test										
Gamma Statistics on Detected Data Only											
244	k hat (MLE)	26.66		k star (bias corrected MLE)	N/A						
245	Theta hat (MLE)	0.13		Theta star (bias corrected MLE)	N/A						
246	nu hat (MLE)	106.6		nu star (bias corrected)	N/A						
247	MLE Mean (bias corrected)	N/A		95% Percentile of Chisquare (2k)	N/A						
248	MLE Sd (bias corrected)	N/A		95% Percentile of Chisquare (2k)	N/A						



**APPENDIX H**  
**ANALYTICAL DATA TABLE**

## Alpha Spectrometry Analysis (pCi/g)

Gamma Spectrometry Analysis (pCi/g)

Sample Information												Gamma Spectrometry Analysis (pCi/g)															
				U-238 Decay Series						U-235 Decay Series						Th-232 Decay Series						Alpha Spectrometry Analysis (pCi/g)					
Sample ID		Date Collected	U-238	Th-234	Ra-226	Pb-214	Bi-214	Pb-210	U-235	Pb-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bi-212	Th-208	Th-228	Th-230	Th-232	U-233	U-235	U-238				
Blanchette-Grass-1	S522/2014	1.73 U	1.32	1.17	1.32	2.69 U	0.368 U	0.583 U	0.051 U	1.38	1.38	1.09	2.05	0.382	0.810	0.823	0.706	0.671	0.625 U	0.896	0.659	0.659	0.659				
Blanchette-Grass-2	S522/2014	3.21 U	1.24	1.14	3.21 U	1.24	1.14	0.359 U	0.010 U	0.499 U	0.499 U	1.09	1.10 U	0.439	0.536	0.968	0.781	0.655	0.655	0.655	0.655	0.655	0.655	0.655			
Blanchette-Grass-3	S522/2014	1.20 U	1.16	1.14	1.20 U	1.16	1.14	0.366 U	0.035 U	0.401 U	0.401 U	1.18	1.18	0.450 U	0.247	0.522	0.655	0.655	0.655	0.655	0.655	0.655	0.655				
Blanchette-Grass-4	S522/2014	1.31 U	1.15	1.15	1.31 U	1.15	1.15	0.389 U	0.610 U	-0.403 U	-0.403 U	1.38	1.38	1.04	0.287	0.511	0.772	0.772	0.772	0.772	0.772	0.772	0.772				
Blanchette-Grass-5	S522/2014	2.24 U	1.14	1.14	2.24 U	1.14	1.14	0.359 U	0.297 U	0.0453 U	0.0453 U	1.41	1.41	0.905 U	0.896 U	0.273	0.560	0.655	0.655	0.655	0.655	0.655	0.655				
Blanchette-Grass-6	S522/2014	0.565 U	0.565 U	1.04	1.19	1.04	1.19	0.935	0.402 U	0.0528 U	-0.409 U	1.15	1.15	1.00	0.623 U	0.449	0.738	1.08	0.644	0.656	0.656	0.656	0.656				
Blanchette-Soil-1	S522/2014	1.35 U	1.35 U	1.09	1.02	1.09	1.06 U	0.384 U	0.248 U	0.332 U	0.0996 U	1.12	1.12	0.505 U	0.305	0.729	0.636	0.622	0.622	0.622	0.622	0.622	0.622				
Blanchette-Soil-2	S522/2014	1.394 U	1.09	1.09	1.71 U	1.01	1.01	1.47 U	0.125 U	0.320 U	0.0655 U	1.04	1.04	0.878 U	0.406 U	0.410	0.688	0.734	0.867	0.464	0.89866 U	0.549	0.549				
Blanchette-Soil-3	S522/2014	1.71 U	1.01	1.01	1.71 U	1.01	1.01	0.943 U	0.676 U	0.843 U	0.793 U	1.04	1.04	0.603 U	0.616	0.300	0.495	0.720	0.780	0.578	0.578	0.578	0.578				
Blanchette-Soil-4	S522/2014	0.974 U	0.843	0.676	1.22 U	0.794	0.889 U	0.794	0.804	0.804	1.16 U	1.16	0.893 U	0.843 U	0.331	0.658	0.857	0.752	0.578	0.578	0.578	0.578	0.578				
Blanchette-Soil-5	S522/2014	0.498 U	0.498 U	0.909	0.804	0.804	0.804	0.909	0.804	0.804	0.500 U	0.500 U	-0.46 U	-0.46 U	0.635	0.655	0.753	0.753	0.667	0.764	0.538	0.540	0.538				
Blanchette-Soil-6	S522/2014	0.498 U	0.498 U	0.909	0.804	0.804	0.804	0.909	0.804	0.804	0.500 U	0.500 U	-0.46 U	-0.46 U	0.635	0.655	0.753	0.753	0.667	0.764	0.538	0.540	0.538				
Koch-Grass-1	S522/2014	1.92 U	1.19	1.46	1.19	2.79	0.145 U	0.439 U	0.122 U	1.04	1.04	1.04	1.23	1.78	0.378	0.707	0.906	0.876	0.698	0.0141 U	0.610	0.610	0.610				
Koch-Grass-2	S522/2014	0.900 U	0.900 U	1.29	1.29	2.14 U	0.386 U	0.701 U	0.131 U	1.26	1.26	1.03	0.234 U	0.398	0.751	1.12	0.865	0.582	0.0429	0.567	0.567	0.567	0.567				
Koch-Grass-3	S522/2014	0.741 U	1.19	1.34	1.34	3.14 U	0.148 U	0.576 U	0.0992 U	0.980 U	0.980 U	1.07	1.75	0.348	0.748	1.16	1.16	0.748	0.691	0.0653 U	0.664	0.664	0.664				
Koch-Grass-4	S522/2014	0.741 U	1.19	1.34	1.34	3.14 U	0.148 U	0.576 U	0.0992 U	0.980 U	0.980 U	1.07	1.75	0.348	0.748	1.16	1.16	0.748	0.691	0.0653 U	0.664	0.664	0.664				
Koch-Grass-5	S522/2014	0.707 U	1.30	1.49	1.30	1.53 U	0.259 U	0.255 U	0.149 U	0.0458 U	0.716 U	1.23	0.79 U	0.733	0.733	0.947	0.678	0.655	0.655	0.655	0.655	0.655	0.655				
Koch-Grass-6	S522/2014	3.66	1.13	1.41	1.13	2.16 U	0.211 U	0.613 U	0.311 U	0.724 U	0.860 U	1.16	1.16	1.02	0.361	0.733	1.19	0.981	0.434	-0.00534 U	0.523	0.523	0.523				
Koch-Soil-1	S522/2014	0.876 U	0.876 U	1.36	1.36	0.714 U	0.242 U	0.878 U	0.188 U	0.833 U	0.860 U	1.04	1.04	0.809 U	0.456	0.721	0.721	0.721	0.721	0.721	0.721	0.721	0.721				
Koch-Soil-2	S522/2014	0.876 U	0.876 U	1.36	1.36	0.714 U	0.242 U	0.878 U	0.188 U	0.833 U	0.860 U	1.04	1.04	0.809 U	0.456	0.721	0.721	0.721	0.721	0.721	0.721	0.721					
Koch-Soil-3	S522/2014	1.48 U	0.986	1.44	1.44	0.986	0.986	0.273 U	0.230 U	0.479 U	0.479 U	1.28	1.28	1.07	0.902 U	0.486	0.904	0.714	0.442	0.442	0.442	0.442	0.442				
Koch-Soil-4	S522/2014	1.08 U	1.65	1.28	1.28	1.65	1.28	1.28	0.415 U	0.4227 U	0.4227 U	1.21	1.21	1.17	0.405 U	0.919 U	0.850	0.533	0.686	0.686	0.686	0.686					
Koch-Soil-5	S522/2014	2.67	1.21	1.24	1.24	1.24	1.24	1.24	0.389 U	0.137 U	0.775 U	0.123 U	0.928 U	0.928 U	1.22	1.14 U	0.449	0.617	1.12	0.814	0.594	0.0469	0.582				
Koch-Soil-6	S522/2014	0.692 U	1.26	1.17	1.26	1.04 U	0.173 U	0.282 U	0.282 U	0.173 U	0.173 U	1.30	1.30	0.911 U	0.386 U	0.412	0.576	0.824	0.636	0.405	0.0310 U	0.635					
BMAC Discrete Samples																											
BMAC-Discrete-00	S521/2014	1.07 U	1.08	1.34	1.08	1.34	1.41	1.37	1.37	1.26	1.26	1.62	1.62	1.08	0.643 U	0.348	1.05	0.960	0.894	0.722	0.0315 U	0.704	0.704	0.704			
BMAC-Discrete-01	S521/2014	0.600 U	0.600 U	1.41	1.41	6.55	1.41	1.41	1.26	1.26	1.26	1.05	1.05	0.743 U	1.39	0.335	0.636	1.23	0.646	0.883	0.0310 U	0.810	0.810	0.810			
BMAC-Discrete-02	S521/2014	1.11 U	1.11 U	4.34	4.34	2.23 U	1.03 U	1.03 U	0.575 U	0.575 U	0.575 U	0.748	0.748	0.748	0.748	0.654	0.654	0.654	0.654	0.654	0.654	0.654	0.654				
BMAC-Discrete-03	S521/2014	1.942 U	1.14	1.26	1.14	2.77 U	0.105 U	0.172 U	-0.241 U	1.31	1.31	1.11	1.31	1.11	0.723 U	0.374	0.836	0.792	0.707	0.625	0.0291 U	0.562	0.562	0.562			
BMAC-Discrete-04	S521/2014	0.942 U	0.942 U	1.14	1.26	1.14	2.77 U	0.105 U	0.172 U	-0.241 U	1.31	1.31	1.11	1.31	1.11	0.723 U	0.374	0.836	0.792	0.707	0.625	0.0287 U	0.593	0.593	0.593		
BMAC-Discrete-05	S521/2014	0.705 U	0.943	0.876	0.943	9.45	0.741 U	0.242 U	0.878 U	0.188 U	0.860 U	0.860 U	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851	0.851				
BMAC-Discrete-06	S521/2014	0.928 U	0.718	0.718	0.718	0.718	0.718	0.718	0.214 U	0.298 U	0.298 U	1.30	1.30	0.910 U	0.714 U	0.366	0.637	0.637	0.637	0.637	0.637	0.637					
BMAC-Discrete-07	S521/2014	0.737 U	0.737 U	1.23	1.15	1.23	1.23	1.23	0.233 U	0.233 U	0.233 U	1.23	1.23	1.03 U	0.714 U	0.328	0.637	0.637	0.637	0.637	0.637	0.637					
BMAC-Discrete-08	S521/2014	0.980 U	0.980 U	1.27	1.14	3.94	1.26 U	0.269 U	0.954 U	0.954 U	0.954 U	1.10	1.10	1.07	0.607 U	0.379	0.918	0.887	0.723	0.442	0.0312 U	0.808	0.808	0.808			
BMAC-Discrete-09	S521/2014	0.636 U	0.636 U	0.844	0.844	2.91	0.105 U	0.172 U	-0.241 U	1.31	1.31	1.11	1.31	1.11	0.723 U	0.374	0.918	0.894	0.723	0.442	0.0312 U	0.808	0.808	0.808			
BMAC-Discrete-10	S521/2014	0.920 U	1.13	0.960	1.13	3.18 U	0.185 U	0.671 U	0.671 U	0.671 U	1.23	1.23	1.03	1.23	1.03	0.723 U	0.374	0.918	0.894	0.723	0.442	0.0312 U	0.808	0.808	0.808		
BMAC-Discrete-11	S523/2014	1.66 U	1.66 U	1.44	1.44	1.22	1.22	1.22	0.258 U	0.258 U	0.258 U	1.15	1.15	0.986	0.986	1.04	0.727 U	0.374	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-12	S523/2014	1.64 U	1.64 U	1.21	1.21	0.984	1.21	1.21	0.231 U	0.231 U	0.231 U	1.23	1.23	1.10 U	0.986	1.04	0.727 U	0.374	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-13	S523/2014	1.62 U	1.62 U	1.10	1.27	1.10	1.37	1.10	0.916	1.40 U	-0.0474 U	0.713 U	1.13	1.13	1.25	0.613 U	0.397	0.918	1.00	0.841	0.841	0.727	0.374	0.918	0.894	0.727	0.442
BMAC-Discrete-14	S523/2014	1.34 U	1.34 U	1.14	1.14	1.14	1.14	1.14	0.230 U	0.230 U	0.230 U	1.11 U	1.11	1.11	1.11	1.11	0.586 U	0.397	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-15	S523/2014	2.10	1.21	0.728	1.12	1.12	1.12	1.12	0.139 U	0.139 U	0.139 U	1.18 U	1.18	1.18	1.18	1.18	0.636 U	0.397	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-16	S523/2014	0.763 U	0.763 U	1.15	0.978	0.977	0.977	0.977	0.263 U	0.263 U	0.263 U	1.20 U	1.20	1.20	1.20	1.20	0.636 U	0.397	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-17	S523/2014	1.60 U	1.60 U	1.04	1.04	1.04	1.04	1.04	0.172 U	0.172 U	0.172 U	1.20 U	1.20	1.20	1.20	1.20	0.636 U	0.397	0.918	0.894	0.727	0.442	0.0312 U	0.808	0.808	0.808	
BMAC-Discrete-18	S523/2014	0.406 U	0.406 U	1.17	1.17	1.24 U	0.172 U	0.172 U	0.172 U	0.1																	

Sample Information		Gamma Spectrometry Analysis ( $\mu\text{Ci/g}$ )												Alpha Spectrometry Analysis ( $\mu\text{Ci/g}$ )														
Sample ID	Date Collected	U-238 Decay Series						U-235 Decay Series						Th-232 Decay Series						Isotopic Thorium								
		U-238	Th-234	Ra-226	Ph-214	Pb-210	U-235	Pa-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bk-212	Tl-208	Th-228	Th-230	Th-232	U-233	U-235	U-236	U-238						
BMAC-Grass-1	5/23/2014	1.27 U	1.27 U	1.16	1.43	0.791	0.791	0.791	0.791	0.822 U	0.810 U	-0.557 U	1.18	1.18	1.25	-0.0296 U	0.315	0.756	0.994 +	0.817	0.657	0.0107 U	0.652					
BMAC-Grass-2	5/23/2014	1.29 U	1.29 U	1.29 U	1.45	1.18	2.29 U	0.548 U	0.424 U	-0.0592 U	1.29	1.29	1.45	0.506	0.935	0.906 J+	0.926	0.682	0.0236 U	0.546	0.546	0.0236 U	0.546					
BMAC-Grass-3	5/23/2014	1.66 U	1.66 U	1.13	1.07	1.13	1.18 U	0.0107 U	0.816 U	0.0188 U	1.34	1.34	1.45	1.18	2.62	0.391	0.917	1.11	0.794	0.787	0.0126 U	0.684	0.684	0.0126 U	0.684			
BMAC-Grass-4	5/23/2014	0.832 U	0.832 U	1.13	1.39	4.44	0.201 U	0.554 U	-0.0808 U	1.45	1.45	1.30	0.464 U	0.481	1.03	1.08	0.777	0.777	0.626	0.0233 U	0.606	0.606	0.0233 U	0.606				
BMAC-Grass-5	5/23/2014	1.36 U	1.36 U	1.39	1.58	0.665	0.523	0.544 U	0.651 U	0.190 U	-0.202 U	0.254	0.254	0.551	0.551	0.211	0.454	0.485	0.384	0.0508 U	0.529	0.529	0.0508 U	0.529				
BMAC-Grass-6	5/23/2014	0.853 U	0.853 U	0.853 U	0.665	0.523	0.544 U	0.651 U	0.190 U	-0.202 U	0.254	0.254	0.551	0.551	0.211	0.454	0.485	0.384	0.0508 U	0.529	0.529	0.0508 U	0.529					
BMAC-Grass-7	5/23/2014	1.76 U	1.76 U	1.14	1.15	1.14	1.78 U	0.0231 U	0.451 U	-0.531 U	0.711	0.711	0.711	1.07	0.846 U	0.410	1.02	1.08	1.01	0.840	0.0682	0.778	0.778	0.0682	0.778			
BMAC-Grass-8	5/23/2014	1.33 U	1.33 U	0.625	0.640	0.625	1.36 U	0.114 U	0.494 U	-0.216 U	0.769	0.769	0.769	0.538	1.03	0.203	0.544	0.566 J+	0.533	0.401	0.0661 U	0.409	0.409	0.0661 U	0.409			
BMAC-Grass-9	5/23/2014	0.0240 U	0.0240 U	0.548	0.576	0.548	0.3377 U	0.0729 U	0.306 U	-0.295 U	0.533	0.533	0.533	0.493	0.645 U	0.178	0.501	0.766 J+	0.468	0.577	0.0127 U	0.577	0.577	0.0127 U	0.577			
BMAC-Grass-10	5/23/2014	1.76 U	1.76 U	1.35	1.44	3.44	0.145 U	0.871 U	0.018 U	0.904	0.904	0.904	1.25	0.946 U	0.308	1.24	1.18	0.843	0.844	0.0713	0.898	0.898	0.0713	0.898				
BMAC-Grass-11	5/23/2014	0.908 U	0.908 U	0.950	1.21	0.950	0.843 U	0.133 U	0.737 U	-0.0447 U	0.984	0.984	0.984	0.988	1.07 U	0.464	0.940	0.918 J+	0.848	0.673	0.0239 U	0.682	0.682	0.0239 U	0.682			
BMAC-Grass-12	5/23/2014	0.974 U	0.974 U	0.983	0.97	0.983	1.36 U	0.170 U	0.594 U	0.106 U	1.02	1.02	1.02	0.914	1.06	0.341	0.786	0.999 J+	0.689	0.577	0.0239 U	0.540	0.540	0.0239 U	0.540			
BMAC-Grass-13	5/23/2014	1.79 U	1.79 U	0.929	1.30	0.929	2.34 U	0.146 U	0.267 U	0.379	0.640	0.640	0.640	1.04	1.38	0.367	0.783	0.853 J+	0.702	0.612	-0.0267 U	0.672	0.672	-0.0267 U	0.672			
BMAC-Grass-14	5/23/2014	0.739 U	0.739 U	0.467	0.767	0.467	0.938 U	0.141 U	0.355 U	-0.433 U	0.749	0.749	0.749	0.495	0.989 U	0.221	0.599	0.676 J+	0.637	0.407	0.0343 U	0.466	0.466	0.0343 U	0.466			
BMAC-Grass-15	5/23/2014	1.70 U	1.70 U	1.20	1.16	1.20	0.604 U	0.0159 U	0.993 U	0.165 U	0.907	0.907	0.907	1.06	0.540 U	0.205	0.531	0.963 J+	0.812	0.452	0.0355 U	0.523	0.523	0.0355 U	0.523			
BMAC-Grass-16	5/23/2014	1.08 U	1.08 U	0.606	0.606	0.606	1.68	0.165 U	0.389 U	-0.114 U	0.318	0.318	0.318	0.451	0.939 U	0.152	0.509	0.641 J+	0.380	0.422	0.0285 U	0.523	0.523	0.0285 U	0.523			
BMAC-Grass-17	5/23/2014	0.531 U	0.531 U	0.582	0.572	0.580	-0.156 U	0.414 U	0.414 U	-0.0707 U	0.708	0.708	0.708	0.656	0.599 U	0.181	0.711	0.831 J+	0.445	0.506	0.0259 U	0.457	0.457	0.0259 U	0.457			
BMAC-Grass-18	5/23/2014	0.203 U	0.203 U	0.954	0.954	0.954	0.954	0.954	0.954	0.547	0.657	0.657	0.657	0.960	0.510 U	0.277	0.636	0.752 J+	0.640	0.593	0.0668	0.453	0.453	0.0668	0.453			
BMAC-Grass-19	5/23/2014	0.846 U	0.846 U	1.18	1.25	1.18	2.18 U	0.206 U	0.704 U	0.0224 U	1.08	1.08	1.08	0.905	0.445 U	0.472	0.751	0.859 J+	0.899	0.552	-0.0155 U	0.674	0.674	-0.0155 U	0.674			
BMAC-Grass-20	5/23/2014	1.03 U	1.03 U	1.08	1.24	1.08	2.63	0.828 U	0.828 U	0.828 U	0.828	0.828	0.828	1.14	1.14	0.453	0.945 J+	0.901	0.530	0.0356 U	0.845	0.845	0.0356 U	0.845				
BMAC-Grass-21	5/23/2014	0.640 U	0.640 U	0.551	0.570	0.551	1.06 U	0.0411 U	0.320 U	0.0318 U	0.618	0.618	0.618	0.454	0.948 U	0.205	0.531	0.963 J+	0.862	0.440	0.0297 U	0.846	0.846	0.0297 U	0.846			
BMAC-Grass-22	5/23/2014	0.810 U	0.810 U	1.04	1.12	1.04	3.05	0.529 U	0.704 U	0.113 U	1.52	1.52	1.52	1.13	1.05 U	0.477	0.798	1.03	0.862	0.743	0.0845	0.615	0.615	0.0845	0.615			
BMAC-Grass-23	5/23/2014	0.285 U	0.285 U	0.962	1.44	0.962	0.962	0.962	0.962	0.765 U	-0.07 U	0.844	0.844	0.844	0.844	1.19	0.962	0.62 U	0.337	0.683	0.744 J+	0.744	0.469	0.0313 U	0.657	0.657	0.0313 U	0.657
BMAC-Grass-24	5/23/2014	0.664 U	0.664 U	1.23	1.23	1.23	3.27 U	0.198 U	0.473 U	0.180 U	1.18	1.18	1.18	0.971	1.03 U	0.409	0.721	0.902 J+	0.776	0.593	0.0668	0.453	0.453	0.0668	0.453			
BMAC-Grass-25	5/23/2014	2.25 U	2.25 U	0.890	1.14	0.890	0.902 U	0.245 U	0.211 U	-0.577 U	1.19	1.19	1.19	1.15	0.965 U	0.431	0.848	1.17	0.852	0.852	0.0628	0.653	0.653	0.0628	0.653			
BMAC-Grass-26	5/23/2014	2.15 U	2.15 U	1.09	1.20	1.09	3.08	0.218 U	0.218 U	0.218 U	0.820	0.820	0.820	1.14	1.14	0.453	0.945 J+	0.901	0.530	0.0356 U	0.845	0.845	0.0356 U	0.845				
BMAC-Grass-27	5/23/2014	2.18	2.18	1.39	1.35	1.39	2.47	0.250 U	0.301 U	0.301 U	0.820	0.820	0.820	1.14	1.14	0.453	0.945 J+	0.901	0.530	0.0356 U	0.845	0.845	0.0356 U	0.845				
BMAC-Grass-28	5/23/2014	0.828 U	0.828 U	1.20	1.21	1.20	1.20	1.20	1.20	0.612 U	0.325 U	-0.854 U	0.841	0.841	0.841	0.841	0.846 U	0.205	0.531	0.963 J+	0.862	0.440	0.0297 U	0.846	0.846	0.0297 U	0.846	
BMAC-Grass-29	5/23/2014	1.57 U	1.57 U	0.990	1.04	0.990	2.23	0.23 U	0.240 U	0.601 U	0.120 U	-0.518 U	1.19	1.19	1.19	0.962	0.62 U	0.337	0.683	0.902 J+	0.754	0.469	0.0313 U	0.846	0.846	0.0313 U	0.846	
BMAC-Grass-30	5/23/2014	1.04 U	1.04 U	1.11	1.17	1.11	3.42 U	0.149 U	0.721 U	0.678 U	1.30	1.30	1.30	1.30	0.971 U	0.420	0.722	0.902 J+	0.776	0.593	0.0668	0.453	0.453	0.0668	0.453			
BMAC-Grass-31	5/23/2014	1.02 U	1.02 U	0.652	0.714	0.652	1.11 U	0.195 U	0.643 U	0.435 U	0.865	0.865	0.865	0.735	0.237 U	0.158	0.552	0.602 J+	0.407	0.725	0.0137 U	0.506	0.506	0.0137 U	0.506			
BMAC-Grass-32	5/23/2014	0.728 U	0.728 U	0.588	0.733	0.588	0.588	0.588	0.588	0.314 U	0.576 U	-0.436 U	0.472	0.472	0.472	0.472	0.517 U	0.273	0.582	0.597 J+	0.475	0.475	0.0136 U	0.438	0.438	0.0136 U	0.438	
BMAC-Grass-33	5/23/2014	0.673 U	0.673 U	0.549	0.622	0.549	0.549	0.549	0.549	0.303 U	0.134 U	-0.437 U	0.501	0.501	0.501	0.501	0.578 U	0.236 U	0.582	0.597 J+	0.475	0.475	0.0136 U	0.438	0.438	0.0136 U	0.438	
BMAC-Grass-34	5/23/2014	0.948 U	0.948 U	0.771	0.649	0.771	0.278 U	0.0282 U	0.355 U	0.134 U	0.734	0.734	0.734	1.35	1.35	0.554	0.648 U	0.239	0.539	0.547 J+	0.471	0.471	0.0136 U	0.438	0.438	0.0136 U	0.438	
BMAC-Grass-35	5/23/2014	0.953 U	0.953 U	1.20	1.23	1.20	1.58 U	0.103 U	0.972 U	-0.0232 U	1.55	1.55	1.55	1.28	2.06	0.397	1.11	1.37	0.749	0.922	0.653	0.0137 U	0.438	0.438	0.0137 U	0.438		
BMAC-Grass-36	5/23/2014	1.03 U	1.03 U	1.36	1.36	1.36	2.77	0.149 U	0.601 U	0.612 U	0.723 U	0.678 U	0.678 U	1.30	1.30	1.30	0.971 U	0.229	0.653	0.666 J+	0.881	0.798	0.0137 U	0.438	0.438	0.0137 U	0.438	
BMAC-Grass																												

Sample Information		Gamma Spectrometry Analysis (pCi/g)												Alpha Spectrometry Analysis (pCi/g)									
Sample ID	Date Collected	U-238 Decay Series						U-235 Decay Series						Th-232 Decay Series						Isotopic Thorium			
		U-238	Th-234	Ra-226	Pb-214	Bi-214	Pb-210	U-235	Pa-231	Ac-227	Th-232	Ra-228	Ac-228	Pb-212	Bi-212	Pb-208	Th-228	Th-232	Th-234	U-233	U-235	U-236	U-238
BMAC-Soil-28	5/23/2014	0.432 U	0.432 U	0.742	0.916	0.742	0.00036 U	0.125 U	0.188 U	0.846	0.846	0.846	0.694	0.622	0.714	0.588	0.592	0.618	0.6379 U	0.618	0.618	0.618	0.618
BMAC-Soil-29	5/23/2014	0.196 U	0.196 U	0.783	0.834	0.783	0.285 U	1.36 U	0.285 U	0.573 U	0.635	0.635	0.635	0.733	0.299 U	0.243	0.684	0.706	0.603	0.423	-0.00752 U	0.513	0.513
BMAC-Soil-30	5/23/2014	0.871 U	0.871 U	0.803	0.9377	0.803	2.57 U	0.204 U	0.162 U	-0.0804 U	0.556 U	0.556 U	0.556 U	0.681	0.477 U	0.350	0.644	0.851	0.530	0.492	0.000 U	0.529	0.529

Notes:

Ac-227  
 Actinium-227  
 Actinium-228  
 Ac-228  
 Bismuth-212  
 Bi-212  
 Bismuth-214  
 Bridgton Municipal Athletic Complex  
 BMAC  
 J  
 The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.  
 I+  
 The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and may be biased high.  
 Pb-231  
 Pb-210  
 Pb-212  
 Pb-214  
 Lead-210  
 Lead-212  
 Lead-214  
 Lead-214  
 picCuries per gram  
 pCi/g  
 Preliminary Remediation Goal  
 PRG  
 Preliminary Remediation Goal including daughters  
 PRG +D  
 Ra-226  
 Radium-226  
 Ra-228  
 Radium-228  
 Th-228  
 Thorium-228  
 Th-230  
 Thorium-230  
 Th-232  
 Thorium-232  
 Thorium-234  
 Th-234  
 Thallium-208  
 Th-208  
 U-  
 The analyte was analyzed for, but was not detected above the reported sample quantitation limit.  
 U-233  
 Uranium-233  
 Uranium-234  
 Uranium-235  
 Uranium-236  
 Uranium-236  
 Uranium-238  
 The analyte was analyzed for, but was not detected above the reported sample quantitation limit, which is estimated.  
 UJ

**APPENDIX I**  
**PRE-CERCLIS SCREENING FORM**

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

<b>I. SITE NAME AND LOCATION:</b>		
NAME: Bridgeton Municipal Athletic Complex		
ADDRESS OR OTHER LOCATION IDENTIFIER: 13161 Taussig Road		
CITY: Bridgeton	STATE: Missouri	ZIP: 63044
<b>DIRECTIONS TO SITE:</b> From Kansas City, Missouri, go east on Interstate 70 for approximately 221 miles to exit 224. Take MO-370 east for approximately 11 miles. Take exit 11 for Saint Louis Mills Boulevard and turn left. Turn right on Taussig Road and continue for approximately 0.6 mile. <b>MAP ATTACHED:</b> see Appendix A of Pre-CERCLIS Screening report		
<b>II. PROGRAM CONTACTS:</b>		
REQUESTED BY: Todd Campbell	DATE OF REQUEST: 05/05/2014	
AGENCY/OFFICE: Environmental Protection Agency (EPA)/Region 7 Superfund Division		
MAILING ADDRESS: 11201 Renner Boulevard		
CITY: Lenexa	STATE: Kansas	ZIP: 66219
TELEPHONE: (913) 551-7115	FAX: (913) 551-7066	
EVALUATOR: Danny O'Connor		
AGENCY/OFFICE: Tetra Tech, Inc.		
MAILING ADDRESS: 415 Oak Street		
CITY: Kansas City	STATE: Missouri	ZIP: 64106
TELEPHONE: (816) 412-1777	FAX: (816) 410-1748	
<b>III. SITE INFORMATION:</b>		
TYPE OF FACILITY: City Park	TYPE OF OWNERSHIP: City	
OWNER/OPERATOR INFORMATION: See page 5		
SITE STATUS (active/inactive): Active	YEARS OF OPERATION: 40 years	
<b>OPERATIONAL HISTORY: (How was the site identified?)</b> On May 5, 2014, the Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to assist with a Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (Pre-CERCLIS) Screening at the Bridgeton Municipal Athletic Complex (BMAC) in Bridgeton, Missouri. The Pre-CERCLIS Screening was conducted to determine if further Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response would be warranted. The screening activity was in response to a request by the Missouri Attorney General to the EPA Regional Administrator after a community group conducted field screening of soil at BMAC and reported detection of elevated radiation readings.		
<b>IV. PRE-CERCLIS SCREENING ASSESSMENT CHECKLIST/DECISIONS</b>		
(Criteria from "Improving Site Assessment: Pre-CERCLIS Screening Assessments," OSWER Directive #9375.2-11FS, EPA-540-F-98-039, PB98-963310, October 1999)		
1. Does the site already appear in CERCLIS?		YES <input type="checkbox"/> or NO <input checked="" type="checkbox"/>
(If YES, this form may be inappropriate to document site decisions, i.e., a CERCLA PA (at a minimum) is required.)		
2. Is the release from products that are part of the structure of, and result in exposure within, residential buildings or businesses or community structures?		YES <input type="checkbox"/> or NO <input checked="" type="checkbox"/>
(If YES, then explain in Section V.)		
3. Does the site consist of a release of a naturally occurring substance in its unaltered form, or solely through naturally occurring processes or phenomena, from a location where it is naturally found?		YES <input type="checkbox"/> or NO <input checked="" type="checkbox"/>
(If YES, then explain in Section V.)		
4. Is the release into a public or private drinking water supply due to deterioration of the system through ordinary use?		YES <input type="checkbox"/> or NO <input checked="" type="checkbox"/>
(If YES, then explain in Section V.)		

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

5. Is some other program actively involved with the site (i.e., another Federal, State, or Tribal program)?  
 YES  NO

(If YES, then explain in Section V.)

6. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?  
 YES  NO

(If YES, then explain in Section V.)

7. Are the hazardous substances potentially released at the site excluded by policy considerations (e.g., deferral to RCRA Corrective Action)?  
 YES  NO

(If YES, then explain in Section V.)

Check one, either 8.a or 8.b, whichever applies

8. a. Is there sufficient documentation that clearly demonstrates that there is no potential for a release that could cause adverse environmental or human health impacts (e.g., comprehensive remedial investigation equivalent data showing no release above ARARs, completed removal action, documentation showing that no hazardous substance releases have occurred, EPA approved risk assessment completed)?  
 YES  NO

(Explain in Section V.)

8. b. Based on limited sampling that has been performed at/near the site in conjunction with Pre-CERCLIS Screening Assessment, is there a potential for a release that could cause adverse environmental or human health impacts?  
 YES  NO

(Explain in Section V)

Yes -> Explain in the following Sections whether or not a CERCLA response action (CERCLIS entry) is warranted.

No -> No CERCLIS entry is warranted. Explain in the following Sections.

### V. SUPERFUND SITE SCREENING CRITERIA

#### A. REMEDIAL CRITERIA

##### 1. SOURCE AND WASTE CHARACTERISTICS

KNOWN OR SUSPECTED SOURCE TYPES AND LOCATIONS:

SIZE OF SOURCES AND QUANTITIES (Volume, Area):

WASTE TYPES OR HAZARDOUS SUBSTANCES KNOWN OR SUSPECTED TO BE PRESENT:

##### 2. GROUND WATER PATHWAY:

What is the likelihood that a release to groundwater has occurred at the site? Groundwater sampling was not included with the Pre-CERCLIS Screening. However, a release to groundwater is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening.

If a release is not suspected proceed to A.3.

##### a. USE AND CHARACTERISTICS:

GENERAL STRATIGRAPHY AND HYDROLOGY:

PRESENCE OF KARST TERRAIN:

DEPTH TO SHALLOWEST AQUIFER:

PRIVATE WELLS WITHIN 4 MILES (locations and population served):

MUNICIPAL WELLS WITHIN 4 MILES (locations and population served):

DISTANCE TO NEAREST DRINKING WATER WELL:

WELLHEAD PROTECTION AREAS:

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

### **3. SURFACE WATER PATHWAY:**

**What is the likelihood that a release to surface water has occurred at the site?** Surface water sampling was not included with the Pre-CERCLIS Screening. However, a release to surface water is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening.

If a release is not suspected proceed to A.4.

#### **a. USE AND CHARACTERISTICS:**

**FLOOD FREQUENCY:**

**DISTANCE TO NEAREST SURFACE WATER:**

**SURFACE WATER BODIES WITHIN 15 DOWNSTREAM MILES:**

**DESIGNATED AND/OR PROTECTED USES OF SURFACE WATER BODIES:**

**DRINKING WATER INTAKES WITHIN 15 DOWNSTREAM MILES (locations and populations served):**

**FISHERIES WITHIN 15 DOWNSTREAM MILES:**

**KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS AND WETLANDS WITHIN 15 DOWNSTREAM MILES:**

### **4. SOIL EXPOSURE PATHWAY:**

**What is the likelihood of exposure to hazardous substances at the site?** A release to soil is unlikely, due to no significant findings during the gross gamma survey or soil sampling conducted at the site.

#### **a. CHARACTERISTICS:**

**NUMBER OF PEOPLE LIVING WITHIN 200 FEET:**

**SCHOOLS OR DAY-CARES WITHIN 200 FEET:**

**POPULATIONS WITHIN 1 MILE:**

**NUMBER OF WORKERS AT THE FACILITY OR ADJACENT FACILITIES WHERE CONTAMINATION IS SUSPECTED:**

**LOCATIONS OF KNOWN OR POTENTIAL TERRESTRIAL SENSITIVE ENVIRONMENTS:**

### **5. AIR PATHWAY:**

**What is the likelihood that a release of hazardous substances is migrating from the site to the air?** Air sampling was not included with the Pre-CERCLIS Screening. A release to air is unlikely, due to no significant surface soil findings resulting from the Pre-CERCLIS Screening.

If a release is not suspected proceed to B.

#### **a. CHARACTERISTICS**

**POPULATIONS WITHIN 4 MILES:**

**DISTANCE TO NEAREST INDIVIDUAL:**

**LOCATIONS OF KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS WITHIN 0 TO 1/4 MILE AND 1/4 TO ½ MILE:**

### **B. REMOVAL CRITERIA**

**IS THERE A RELEASE AS DEFINED BY THE NCP?**

**YES  or NO**

**EXPLAIN:** Review of gross gamma survey data and soil sample data from BMAC did not indicate a release.

*(A RELEASE is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment of barrels, containers, and other closed receptacles containing any hazardous substances or pollutant or contaminant), but excludes: workplace exposures; engine exhaust emissions; nuclear releases otherwise regulated; and the normal application of fertilizer. For purposes of the NCP, release also means threat of release.[40 CFR 300.410(e)])*

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

**IS THE SOURCE A FACILITY OR VESSEL AS DEFINED BY THE NCP?**

YES  or NO

**EXPLAIN:** No release was identified at the site.

*(A FACILITY is defined as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or POTW), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft or any site or area, where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel. A VESSEL is defined as any description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel. [40 CFR 300.410(e)]*

**DOES THE RELEASE INVOLVE A HAZARDOUS SUBSTANCE, POLLUTANT,  
OR CONTAMINANT AS DEFINED BY THE NCP?**

YES  or NO

**EXPLAIN:** No hazardous substance, pollutant, or contaminant was documented at the site.

*(A HAZARDOUS SUBSTANCE means any substance, element, compound, mixture, solution, hazardous waste, toxic pollutant, hazardous air pollutant, or imminently hazardous chemical substance or mixture designated pursuant to the CWA, CERCLA, SDWA, CAA or TSCA. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas. The definition of POLLUTANT or CONTAMINANT includes, but is not limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions or physical deformations, in such organisms or their offspring. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas.).[40 CFR 300.410(e)]*

**IS THE RELEASE SUBJECT TO THE LIMITATIONS ON RESPONSE?**

YES  or NO

**EXPLAIN:** No limitations on response apply.

*(The LIMITATIONS ON RESPONSE provisions of the NCP (40 CFR 300.400(B) states that removals shall not be undertaken in response to a release: of a naturally occurring substance in its unaltered or natural form; from products that are a part of the structure of, and result in exposure within, residential buildings or business or community structures; or into public or private drinking water supplies due to deterioration of the system through ordinary use.).[40 CFR 300.410(e)]*

**DOES THE QUANTITY OR CONCENTRATION WARRANT RESPONSE?**

YES  or NO

**EXPLAIN:** No release was identified at the site.

*[40 CFR 300.410(e)]*

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

**B. REMOVAL CRITERIA (continued):**

**HAS A PRP BEEN IDENTIFIED? (Include name, address and telephone number)** YES  or NO

**EXPLAIN:** No release was identified at the site; therefore, there is no PRP.

*[40 CFR 300.410(e)]*

**IS THERE AN ACTUAL OR POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS, OR CONTAMINANTS?** YES  or NO

**EXPLAIN:** No release was identified at the site.

**IS THERE ACTUAL OR A POTENTIAL FOR CONTAMINATION OF DRINKING WATER SUPPLIES?** YES  or NO

**EXPLAIN:** No release was identified at the site; therefore, no drinking water contamination is suspected.

**ARE THERE HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN DRUMS, BARRELS, OR BULK STORAGE CONTAINERS?** YES  or NO

**EXPLAIN:**

**ARE THERE HIGH LEVELS OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN NEAR-SURFACE SOILS?** YES  or NO

**EXPLAIN:** All reported radionuclides were below comparative risk-based standards.

*(“High levels” may be determined by streamlined risk assessments, health consultations, state or federal soil screening criteria, and/or Superfund program policies or directives.)*

**ARE THERE CONDITIONS ON SITE WHICH MAY BE SUSCEPTIBLE TO IMPACT FROM ADVERSE WEATHER CONDITIONS?** YES  or NO

**EXPLAIN:** No release was identified at the site.

**IS THERE A THREAT OF FIRE OR EXPLOSION?** YES  or NO

**EXPLAIN:**

**IS THERE A POTENTIAL FOR OTHER FEDERAL OR STATE RESPONSE MECHANISMS? YES  or NO  IF SO, IDENTIFY THE APPROPRIATE PROGRAM:**

RCRA       NRC       FIFRA       UST       OTHER FEDERAL(      )       STATE DEFERRAL

**EXPLAIN:**

**ARE THERE OTHER SITUATIONS OR FACTORS WHICH WARRANT FURTHER SUPERFUND RESPONSE?** YES  or NO

**EXPLAIN:**

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

### **VI. SUPERFUND SITE SCREENING FINDINGS AND RECOMMENDATIONS:**

**NO FURTHER SUPERFUND RESPONSE ACTION REQUIRED - SUPERFUND CERCLIS ENTRY NOT WARRANTED**

(Cite the appropriate criteria from SECTION V as the basis for the above determination.)

<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>	<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>
	X		Ground Water Pathway Threat		X		Direct Exposure Pathway Threat
X			Surface Water Pathway Threat		X		Air Pathway Threat
X			Release or Threat of Release		X		A Facility or Vessel
X			Hazardous Substance, Pollutant, or Contaminant		X		Subject To Response Limitations
	X		Contaminants present in Significant Quantity and/or Concentration		X		Exposure To Hazardous Substances or Pollutants or Contaminants
	X		Drums, Barrels or Bulk Containers Present		X		High Levels of Contaminants In Surface Soils
X			Site Susceptible To Adverse Weather Conditions		X		Threat of Fire or Explosion
X			Willing/Capable PRP Response		X		Referred To Another Program

**COMMENT:** The Pre-CERCLIS Screening of BMAC included a gross gamma survey of exterior surfaces at BMAC and reference areas along with collection of soil samples for laboratory analysis. The gross gamma survey of exterior ground surfaces at BMAC included collection of 58,716 data points across three surface types (grass-covered areas, exposed soil areas, and improved surfaces). No survey data acquired within BMAC were above twice the mean, a level at which EPA Region 7 typically conducts further investigation. In addition, geographic plots of the data reveal natural differences in gamma activity exhibited by different soil types, or surface materials. No unusual patterns of concentrated discrete areas of elevated gross gamma activity were observed. In addition to surveying exterior ground surfaces, 112 soil samples were collected and analyzed for isotopic uranium, isotopic thorium, radium-226, and other naturally occurring radionuclides. Reference area data were used to calculate a background threshold value (BTV) for each isotope. BMAC analytical data exceeding the BTV was then compared to risk-based standards. To account for naturally occurring radioactive material (NORM), the mean reference area value was subtracted from values exceeding the BTV. Radionuclide concentrations in excess of their BTV were compared with the selected risk-based standards to determine if further data review or investigation was warranted. Two risk-based standards were used for comparison to BMAC analytical data: the EPA total exposure preliminary remediation goals (PRG) for radionuclides in residential soil at a 1 in 10,000 lifetime cancer risk to an individual and the Formerly Utilized Sites Remedial Action Plan (FUSRAP) remediation goals (RG). None of the sample values exceed the PRGs or FUSRAP RGs. Results from the Pre-CERCLIS Screening do not indicate need for further CERCLA assessment at the BMAC site.

**REMOVAL ACTION RECOMMENDED:**  EMERGENCY  TIME-CRITICAL  NON-TIME-CRITICAL

(Cite one or more of the conditions or factors from Section V. REMOVAL CRITERIA, as a basis for recommending that a removal action be conducted.)

<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>	<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>
			Exposure To Hazardous Substances or Pollutants or Contaminants				Actual or A Potential For Contamination of Drinking Water Supplies
			Drums, Barrels or Bulk Containers Present				High Levels of Contaminants Near-Surface Soils
			Site Susceptible To Adverse Weather Conditions				Fire/Explosion Threat
			Other Response Mechanism				Other Factors

**COMMENT:**

## REGION 7 SUPERFUND SITE PRE-CERCLIS SCREENING FORM

**VI. SUPERFUND SITE SCREENING RECOMMENDATIONS (continued):**
**ADDITIONAL INTEGRATED ASSESSMENT RECOMMENDED**

(Cite the appropriate criteria from Section V as a basis for recommending that additional site evaluation be performed.)

<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>	<b>Yes</b>	<b>No</b>	<b>Unknown</b>	<b>Issue</b>
			Ground Water Pathway Threat				Direct Exposure Pathway Threat
			Surface Water Pathway Threat				Air Pathway Threat
			Release or Threat of Release				A Facility or Vessel
			Hazardous Substance, Pollutant, or Contaminant				Subject To Response Limitations
			Contaminants present in Significant Quantity and/or Concentration				Exposure To Hazardous Substances or Pollutants or Contaminants
			Drums, Barrels or Bulk Containers Present				High Levels of Contaminants In Surface Soils
			Site Susceptible To Adverse Weather Conditions				Threat of Fire or Explosion
			Willing/Capable PRP Response				Referred To Another Program

**COMMENT:**

**VII. ADDITIONAL INFORMATION OR COMMENTS**

(NOTE: Complete Site Prioritization Information Summary Attachment for sites recommended for further Integrated Assessment work.)

**EPA USE ONLY**

**VIII. DETERMINATION**

**SIGNATURE:**

Name/Title/Office \_\_\_\_\_

**DATE:** \_\_\_\_\_